VOLUME I
TEXT, TABLES, FIGURES

RCRA FACILITY INVESTIGATION REPORT OF CURRENT CONDITIONS

BASF CORPORATION
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To

Subject BASF MID 064 197 742 - Current Conditions Report 1995

History: This message has been forwarded.

Mike,

In our copy of the 1995 Current Conditions Report (CCR) that we received from EPA, we are missing one table, and most of the figures. The list is summarized below:

Missing Table: Table 10-1, Discharges to Outfall 001

Missing Figures:
1-2, 1-3, 1-4, 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-7, 2-8, 2-09, 2-10, 2-11, 2-12, 2-13, 2-14, 2-15, 2-16, 2-17, 2-18, 2-19, 2-20, 2-21, 2-22, 2-23, 2-25, 2-26, 2-27, 2-28, 2-29, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 3-9A,
4-1, 9-1, 9-2, 10-1, 10-2, 11-1, 13-1, 16-1, 17-1, 21-1.

The figures DEQ has in the report: 1-1, 1-2A, 2-24, 2-30, 2-31, 5-1, 5-2

An electronic copy of the table of contents is attached. The missing table and figures are noted on the pages.

If available electronic versions of the missing table and figures would be appreciated.

Should you have any questions, please contact me.

Thanks for your help.

Rich

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1.0
INTRODUCTION

The purpose of this RCRA Facility Investigation (RFI) is to characterize the nature and extent of the release of hazardous waste or hazardous constituents from regulated units, solid waste management units, and other source areas at the BASF North Works Facility, and to gather necessary data to assess the effectiveness of previous Corrective Measures and, if necessary, support a new Corrective Measures Study (CMS). Figure 1-1 is a general location map for the facility. Figure 1-2 illustrates the facility features, plant areas, solid waste management units (SWMUs) and areas of concern (AOCs).

This Current Conditions Report describes the facility and the history of the facility. Information about the facility and the initial draft of the Current Conditions Report was provided by BASF. The report was edited and finalized by Woodward-Clyde.

Originally founded in 1893, the Michigan Alkali Company merged with the JB Ford Company to form the Wyandotte Chemicals Corporation in 1943. Wyandotte Chemicals was then purchased in 1969 by BASF AG and in 1970 the company was named BASF Wyandotte Corporation. Finally, in 1986, the company became BASF Corporation the name that it presently retains.

Development at the North Works Facility has three basic milestones:

1) Construction of the original soda ash complex (1890s)
2) Construction of a larger, relocated Soda Ash Complex (1920s)
3) Demolition of the Soda Ash Complex and reconfiguration to specialty plants (1970s)

In 1893 the Michigan Alkali Company was established. Building construction began in 1895, and operation of the Soda Ash Complex began in 1896. The complex was located at the front third of the current North Works facility while the eastern two-thirds remained marsh. This soda ash complex consisted of a bicarbonate production plant, lime kilns, coke plant, finishing machines and a soda ash storage and shipping area (Figure 1-3). This complex remained in operation until the 1920s when a larger Soda Ash Complex was built at the North Works (Figure 1-4). It was built for the most part on residues used as fill generated by the older soda ash complex. The old soda ash complex was subsequently dismantled. The newer complex operated from the 1920s to 1978. It also was made up of several production units each of which was either a separate plant or part of an existing plant. In general, many plants have operated throughout the history of North Works however, most have since closed and been demolished. These plants include:

- Original Soda Ash Complex (1890s-1920s)
- 1920s Soda Ash Complex (1920s-1978)
  - Ash Shipping and Storage (1920s-1970s)
  - Crude Bicarbonate of Soda Production (1920s-1970s)
  - FM Finishing Machines for calcining and drying (1920s-1970s)
  - Lime Kilns (1920s-1978)
  - Refined Bicarbonate (1926-1970s)
  - Coke Plant (1927-1966)
  - Purecal (Calcium Carbonate Production)(1939-1970s)
  - Calcium Chloride Plant (1965-1970)
- Foundry (1900s-1965)
- Detroit City Gas Company (1920s and 1930s)
- Packaging Plant(s) (1920s - mid 1970s)
- Boiler House (1920s-1981)
- Kreelon (1940s-1950s)
- High Pressure Laboratory (1940s-late 1980s)
- Carbose (1950s-late 1970s)

- Calcium Hydroxide Unit (in Calcium Carbonate Plant)(1966-1981)
- Iron Oxide Pigment Plant (in Calcium Chlorides Plant)(1978-1987)
- Elastogran Machinery Business (EMB) (Mid 1980s-1993)
- Windshield Adhesives Plant (1988-1993)
- Phosphate Production Unit (1990-1993)
- Small Miscellaneous facilities (i.e. blacksmith, stables, etc.)

Some of the operations which took place at the North Works were not part of, or controlled by the Corporation. These included the Packaging Plants located on the north end of North Works operated for a time by Detroit Soda Products Company and the Detroit City Gas Company that leased a site at the North Works Facility.

North Works Plants that are presently in existence include:

- Corporate Research and Development Complex (1940s-Present)
- Pilot Plant (1940s-Present)
- Polyols Plant (1957-Present)
- Chemical Engineering Research Facility (1960s-Present)
- Vitamins Complex (1970s-Present)
- Steam Facility (1981-Present)
- Elastocell Plant (1986-Present)
- Engineering Plastics Compounding (EPC) Plant (1988-Present)
- Expanded Polyolefin (EPO) Plant (1990-Present)
- Thermoplastic Polyurethane (TPU) Synthesis Plant (1991-Present)
- Polystyrene Pilot Plant (1994-Present)

2.0 BACKGROUND

2.1 SITE DESCRIPTION

The BASF Corporation North Works facility is located on the U.S. shore of the Detroit River at 1609 Biddle Avenue, Wyandotte, Michigan. It is part of Sections 21 and 28, T. 3 S., R. 11 E. It is approximately 1 mile north of downtown Wyandotte.

The facility occupies approximately 230 acres. It is generally described as bounded on the north by Perry Street, on the south by Mulberry Street, on the east by the U.S. Harbor Line of the Detroit River, (Trenton Channel) and on the west by Biddle Avenue (Figures 1-1 and 1-2).

The North Works location was part of a Detroit River marsh prior to European habitation. Development as a manufacturing facility began with drainage and placement of fill materials. Figure 1-2A shows the property as it appeared in 1876. Marshland covered most of the eastern part of the property.

Between 1890 and 1928, the North Works was developed through improved drainage and addition of fill. Figures 2-1, 2-2, 2-3 and 2-4 illustrate the changing drainage and water courses during this development period. Today, approximately 25 to 30 percent of the surface area is covered with buildings, paved streets, paved parking lots, tank farms, surface impoundments and docks. Although several different manufacturing plants continue to operate at this site, the former Soda Ash Plant and structures associated with soda ash production and storage have been removed. Also, brine wells, a coke plant, an electric power generating plant and other related structures have been discontinued and removed. Many of the above ground structures have been demolished, but the concrete at or below grade remains. An extensive network of utilities including potable and service water lines, storm sewers, sanitary sewers, and other utilities typical of an industrial facility this size and age remain underground even though large sections are no longer used and are isolated from the active lines (SSP&A, 1984).

2.2 FACILITY OPERATIONAL HISTORY

This report is based on records from various sources within BASF and from individuals familiar with the history of the facility. The nature of the business and processes located at the North Works changed significantly after 1980. This date marks a transition from manufacturing of inorganic, bulk commodities to specialty plastics, resins and pharmaceutical products. Unless records were retained for legal or technical reasons, pre-1980 data are incomplete. Knowledge of qualified individuals was used to interpret unclear records and supplement this report. While this account is as complete and accurate as possible, BASF acknowledges that it may contain inadvertent omissions and inaccuracies.

The following sections describe each plant or operation at the North Works. Sections 2.2.1 through 2.2.23 describe historical operations. Sections 2.2.24 through 2.2.34 describe operations that currently are functioning at the North Works.

2.2.1 Original Soda Ash Complex

The original Soda Ash Complex is shown in Figure 2-5 based on a 1916 drawing and Figure 1-3 based on a 1922 drawing. The locations where these buildings once stood are now occupied by the features shown in the modern plot plan, Figure 2-6

The operation of the original soda ash complex was substantially identical to the operation detailed below for the better-documented Complex operated from the 1920s to the late 1970s. These operations disposed of the wastes and residues by landfilling on-site consistent with the standards of the time. The only materials utilized or produced that currently are considered hazardous were the by-products of coke plant operations (PNAs, VOCs, Cyanides) and metal residues associated with foundry operations. Undoubtedly, materials ancillary to manufacturing, such as oils, greases, paint, solvents, mercury from broken thermometers, etc., would not have been controlled and could occur in trace amounts at locations where no known source can be identified.

2.2.2 1920s Soda Ash Complex

The location of this complex is shown in Figure 1-4. It was built for the most part on fill generated by the wastes of the older soda ash complex. The "Ashplex" was divided into the following production units, each of which was a separate plant within the integrated complex:

- Ash Storage and Shipping
- Calcium Chloride Solids Plant
- Coke Plant
- Crude Bicarbonate of Soda Production
- FM (Calcining and Drying)
- Lime Kilns
- Purecal (Calcium Carbonate Production)
- Refined Bicarbonate

The general scheme of manufacturing soda ash (sodium carbonate) via the Solvay Process is shown in Figure 2-7.

The process may be summarized as follows:

1) Coal is destructively distilled to Coke in coke ovens with accompanying generation of ammonia gas necessary for use in the Solvay Process.

2) Limestone is burned and decomposed to lime and carbon dioxide in the Lime Kilns.

3) Sodium chloride brine is produced from subsurface salt deposits by solution mining and is purified for use in the process.

4) Ammonia is absorbed into the brine, treated with lime and saturated with carbon dioxide to form a precipitate of crude sodium bicarbonate. This precipitate is filtered.

5) In the FM the crude bicarbonate is heated in a rotary calciner to convert it into sodium carbonate (soda ash) and carbon dioxide.

6) Sodium carbonate and lime are reacted to form calcium carbonate in the Purecal plant.

7) Calcium chloride is purified and dried to product from filtrate liquor of the crude bicarbonate.

Additional information about soda manufacture is contained in Manufacture of Soda by T. P. Hou which is a definitive work on the subject.

2.2.3 Coke Plant

The location of the original 1902 Coke Plant is shown in the 1922 Plot Plan, Figure 1-3. The location of the 1927 facility within the North Works is shown in Figure 2-8. The Coke Plant was based on a Koppers' design, and simplified flow diagrams are shown in Figures 2-9 and 2-10.

Until the mid 1950s, the Coke Plant was the only production facility in the North Works known to have produced hazardous waste as defined by current standards. Benzene, toluene and xylenes were by-products for sale and internal use. Coal tar was a by-product which was sold but sometimes treated as waste, particularly when equipment had to be cleaned of a residual. Agitator wash tank sludge was an identifiable waste, as were collected "drips" from the coke oven gas line. Wastes from distillation of coal to coke contain many minor constituents that vary in composition with the source of the coal. Phenolic compounds and naphthalene-type chemicals are known to have been formed along with ammoniated organic complexes containing sulfur. Ammonia from the ovens, known to contain small amounts of sulfur complexes, was absorbed in water and fed into the Soda Ash Solvay Process.

Coke oven gas containing various organic impurities was sold to Detroit Gas Company. Detroit Gas maintained a purification and compression station at the northwest corner of the North Works and distributed this gas throughout the City of Wyandotte for fuel gas. After natural gas displaced this market, the coke oven gas was used internally without purification by BASF as a direct fuel source. It was distributed across the North Works via an underground pipeline and a pipeline conveyed it to the old South Works for use at that facility.

Coal and coke were stored in open piles. Recovered organics were stored in tanks without dikes. The Coke Plant ceased operations in early 1966 and was demolished shortly after shutdown.

2.2.4 Lime Kilns

The location of the original lime kilns is shown on the 1922 Plot Plan, Figure 1-3. The location of the lime kilns for the 1920s Ashplex is shown in Figure 1-4. The flow diagram of the processing plant is shown on Figure 2-11.

Although several different technical designs of kilns were used over the years, all units functioned essentially the same: fuel (coal, coke, natural gas) was burned in a refractory-lined tower to provide heat that decomposed limestone ($CaCO_3$) to lime (CaO) and carbon dioxide (CO_2). The lime usually was ground to a finished powder for sale or use in the Solvay process. Sometimes the lime was added to water to make slaked lime slurry. Product lime was stored in hoppers within the Lime House and was transported to the Soda Ash

Solvay Process via overhead transfer lines. The lime kilns ceased operation in 1978 and were demolished in the early 1980s.

The only waste products associated with the kilns was carbon monoxide (CO) and improperly or incompletely burned limestone. This lime waste had a high pH. The lime waste was used as fill at the North Works Facility.

2.2.5 Solvay Process (Crude Sodium Bicarbonate Production)

The location of the original Solvay Process is shown in the 1916 Plot Plan, Figure 1-3. The location of this plant at the 1920s Soda Ash Complex is shown in Figure 1-4. A flow diagram for processes in this plant is shown in Figure 2-11.

The chemistry occurring in the various units is shown in the lower left hand corner of Figure 2-11. The basic inputs to the process are lime and carbon dioxide from the kilns, brine from solution mining, and ammonia. Until 1966, the ammonia originated at the coke ovens. The waste product from the process was called Distiller Blow Off (DBO). DBO contained a mixture of sodium carbonate, calcium chloride, sodium chloride, calcium sulfate, sodium sulfate, and some excess lime. These chemicals were partially recovered by other plants before final disposal of the DBO. Figure 2-12 shows the flow diagram of the DBO system. A chemical analysis of DBO is contained on Table 2-1.

The absorber, carbonating towers and ammonia stills were all composed of stacked, cast iron castings. Prior to 1966, small amounts of sulfides present in the ammoniated stream from the coke ovens inhibited corrosion on the cast iron. After 1966, small additions of pure sodium sulfide were added to inhibit corrosion.

The only other materials associated with the operation of the Solvay process were small quantities of reagent chemicals for quality control and the oils, greases, etc. used in maintenance.

2.2.6 FM (Finishing Machines)

The location of the original FM is shown in Figure 2-5. The location of the 1920s facility is shown in Figure 1-4. A flow diagram for the FM is given in Figure 2-11.

The FM contained rotary calciners that converted sodium bicarbonate to sodium carbonate (soda ash), a product, and carbon dioxide which was recycled. The FM also had granular ash dryers for drying a granular soda ash product. Although it was a dusty operation, there were no waste products except off-specification soda ash that was reworked or used for fill.

2.2.7 Purecal (Calcium Carbonate Plant)

The Purecal plant was built in 1939. The location of this plant is shown in Figure 1-4. A flow diagram for an early process (1946) is given in Figure 2-13. Purecal was sold for use as an inert filler material in paper and other products.

During later years, various grades of high purity calcium carbonate were produced in the Purecal plant by reacting calcium chloride filtered from a portion of the DBO waste stream with soda ash to precipitate calcium carbonate. Calcium carbonate was filtered from the liquor and dried. There were no significant waste streams from this plant except the filter liquor. The filter liquor was mixed with the DBO waste stream from which it had originated. This plant utilized a portion of the waste stream as a raw material.

2.2.8 Refined Bicarbonate

The location of the original bicarbonate plant is shown in Figure 2-5. The location of the later plant is shown in Figure 1-4. A flow diagram for refined bicarbonate is shown in Figures 2-14 and 2-15.

Bicarbonate production began in 1897. The plant was completely rebuilt in 1906. A larger plant was built in 1926 at the relocated Ashplex. This plant was approved by the FDA for production of sodium bicarbonate (baking soda).

Sodium bicarbonate was produced by decomposing crude bicarbonate from the Solvay process to sodium carbonate settling and filtering it, then recarbonating it to sodium bicarbonate and filtering and drying the final product. A small amount of alum or other precipitation aid was used. The waste from the settlers was of the same general composition as the DBO Solvay process, and it was mixed with the DBO for disposal. All other by-products were recovered and recycled. Off-spec product was reworked by dissolving it into the crude bicarbonate feed stream.

2.2.9 Calcium Chloride Plant

The location of this plant is given in Figure 1-4, but it is labeled the Transparent Iron Oxide Plant, because the Calcium Chloride Plant ceased operating in this building before the drawing was prepared. Flow diagrams for this plant are given in Figures 2-16 and 2-17.

This plant was built in 1965 to produce road salts and concrete additives from the DBO waste of the Solvay soda ash process. The plant operated until 1970. It produced 56% calcium chloride product by evaporating settled DBO liquor in an evaporator system. The liquid product was stored both in lined steel storage tanks and in a 6 million gallon pond lined with a Hypalon membrane (Figure 1-4). Shipment was by both rail and truck.

Solid calcium chloride was produced by spray drying the 56% liquor and then milling and screening the resultant powder. The powder was stored in a storage dome prior to shipment by rail or truck.

There was essentially no waste from this plant; it processed waste from the Solvay process to a useful product. However, there was spillage of the salt on the ground in the plant area.

2.2.10 Ash Shipping and Storage

The location of the original soda ash storage and shipping is shown in Figure 2-5. The location of the ash storage and shipping for the 1920s complex is shown in Figure 1-4. Soda ash was stored in the stock house and shipped to customers by truck or rail. While there was no waste associated with these operations, spillage of soda ash on the ground reportedly was a common occurrence.

2.2.11 High Purity Calcium Hydroxide

High purity calcium hydroxide was produced in the Purecal building (Figure 1-4) from 1966 until 1981. Figure 2-18 is a flow diagram for this process. The product was ultra-high purity hydrated lime used in the production of a fire resistant fabric. The calcium hydroxide was produced by reacting pure calcium chloride with pure sodium hydroxide. The result was a slurry of calcium hydroxide that was filtered and dried to the finished product. A small amount of hydrochloric acid was used for pH adjustment and regeneration of water deionizers. The waste stream was composed of water, sodium chloride, calcium chloride, sodium hydroxide and calcium hydroxide. The waste stream was combined with the waste DBO from soda ash.

2.2.12 Iron Oxide Pigment Plant

The iron oxide pigment plant was located in a portion of the old calcium chloride solids plant (Figure 1-4). The pigment plant began operation in 1978 and ceased production in 1987. Figure 2-19 gives a flow diagram for processes in this plant. It produced iron oxide pigment (chemically the same as rust) by reacting ferrous sulfate manufactured at BASF's Huntington, West Virginia facility with soda ash to produce iron oxide. The material was filtered and dried. The waste material was initially combined with DBO from the soda ash complex.

After the Ashplex shutdown, the waste water containing sodium sulfate and finely divided iron oxide was treated with lime to assure precipitation and sent to the 6 million gallon rubber lined settling pond which had previously been used for calcium chloride liquor storage. This pond was cleaned of precipitate in 1990, relined and converted to its present use for fire protection water storage. The precipitated sludge was removed from the North Works as nonhazardous waste.

2.2.13 Kreelon

Kreelon was a synthetic organic chemical used as the base for detergent formulations. It was produced in a building on the north end of the North Works that faced Biddle Ave. (Figure 1-2).

Kreelon was made by a controlled chlorination of kerosene to yield keryl chloride. This intermediate was then sulfonated with sulfuric acid to make kerylbenzene sulfonic acid. The sulfonic acid was neutralized with sodium hydroxide to the sodium salt - sodium alkylarylsulfonate. This material was trademarked as Kreelon. This product was dried to a white powder. Solid waste was not generated from this operation.

There is little information on the plant operation; it was discontinued in the 1950s. Figure 2-20 indicates that the storage tanks for this operation were diked to prevent spillage. The skimmer pit also indicated on Figure 2-20 is AOC 3, and it was installed to prevent release of organics to the sewer. References indicate that 90% of the raw materials for the process were delivered to the building and its tank farm by railroad. The benzene used was produced in the coke plant. No information is available on the nature or disposal of any waste products.

2.2.14 Carbose

Carbose was produced in a plant located in the same building as Kreelon production. (Figure 1-4).

Carbose, a trade name for sodium carboxymethylcellulose, was produced by digesting cellulose from paper with caustic in a ribbon blender. The resultant material was then reacted with chloroacetic acid to form the product. It was then filtered and dried for sale as a white powder for use as a thickening agent in toothpaste and cosmetics.

Production began in the 1950s and continued until the late 1970s. Solid waste typically was not generated; however, small amounts of undigested paper residue and off-specification materials would have to be disposed; the disposal method was not recorded.

For a short time in the 1970s sodium metasilicate was produced on a small scale in this building.

2.2.15 The Package Plant(s)

Until the mid 1970s, two buildings on Perry Place at the north end of the North Works were operated as mixing and packaging plants. In the 1920s and 1930s, this operation was controlled by a separate company, Detroit Soda Products, that packaged Michigan Alkali's products into small packages for commercial sale. Later, this operation was incorporated into the main company. These plants are shown in Figure 2-25. They were used for the blending and packaging of detergents and other commercial type cleaning products. No record can be found of the exact materials handled. The blending operation produced little waste except minor amounts of off-specification product.

2.2.16 Detroit City Gas Company

From 1927 to 1937, the Detroit City Gas Company leased a plant site shown in Figure 2-8 (see arrow) for a gas purification facility. They purchased coke oven gas from the Michigan Alkali Company (prior to BASF), purified it and sold it as fuel gas to local residents. Purification consisted of passing the gas through towers containing iron filings. These filings were converted to ferric ferrocyanide (Prussian Blue) by the impurities. Evidence of this waste material have been found at the North Works in the region of this leased area (AOC 7). Gas purification was conducted by Detroit City Gas. The coke oven gas used by Michigan Alkali internally was never processed in such a manner.

2.2.17 High Pressure Laboratory

This Facility was located as shown in Figure 1-4. It was operated from the 1940s until the late 1980s when it was demolished. This facility served a function similar to the BASF Chemical Engineering Department but was used primarily for high pressure work in its special autoclaves. In addition to polyol development and other company-related research, the facility was used in the 1940s and 1950s for government-sponsored research including work on rocket fuels. [illegible] no [illegible] specific [illegible]

2.2.18 Windshield Adhesives Plant

Figure 2-24 shows the location of this plant. It was built in 1988 and ceased operation in 1993. The building is currently used for warehousing. This plant utilized polyol, toluene diisocyanate, toluene, methanol and silane and carbon black to produce a urethane adhesive for installing windshields in automobiles. This plant was designed for spillage containment and throughout its operation employed modern waste management procedures.

The Windshield Adhesives Plant personnel managed a less-than-90-day satellite accumulation area where spent methanol and toluene were collected. The plant also generated hazardous waste streams that included off-specification sealant, toluene/solvent/primer, toluene diisocyanate, QA Lab solvent, and spent activated carbon. These streams were collected in satellite accumulation areas. Nonhazardous waste produced included waste oil from maintenance operations, polyol, and ethylene glycol and water.

2.2.19 Phosphate Production Unit

This unit was located in the Windshield Adhesives Plant. It was brought on line in 1990 and shutdown in 1993. It consisted of two sections: a liquid products section and a solids product section. Figure 2-26 gives a flow diagram of the process in the liquid section. In this process, chromium, zinc and other metallic salts were reacted with nitric and phosphoric acids to yield a phosphate-based metal paint primer. In the solids portion of the plant, phosphate salts were blended to yield a powdered product which was the inhibitor base for phosphate metal primers. Both units were built with spillage containment and operated under modern waste management practices. The Phosphate Unit generated off-specification product and tank washings associated with the metal cleaning and etching solutions.

2.2.20 Boiler House

The location of this former facility is shown adjacent to the Detroit River in Figure 1-4. The first sections of the plant were constructed at this location in the 1920s. The plant ceased operations in 1981 and was demolished shortly thereafter. This was a coal-fired facility having at the end, both stoker fired and pulverized bed boilers with supplemental gas firing. Over the years, there was wide variance in the quality of coal used. Boiler feed water was treated with lime, soda ash and sodium phosphate to precipitate impurities and condition the water.

Two of the pulverized coal boilers had electrostatic precipitators on their stacks at the time of shutdown. There were two primary waste materials. The first was water treatment sludges which were mixed with the Ashplex DBO for settling. The second was fly ash and cinders which were used as a fill material in the North Works. Some fly-ash and cinders were sent off site for disposal. Deposits of ash and cinders encountered during excavating still exhibit a pH of 4 to 5.

2.2.21 Foundry

This unit was located as shown in Figure 1-3. It operated at this location from the early 1900s until it was shutdown in 1965. It cast gray iron primarily that was melted in a cupola. Brass, bronze, and lead-based bearings also were cast from a gas-fired furnace. Almost all castings were "green sand" cast in mold flasks or in pit molds. Molding sand was reprocessed partially, but also widely used as fill at the North Works. This practice may well explain the presence of zinc, copper and other metals found at locations which have no historic use of metal compounds.

2.2.22 Elastogran Machinery Business (EMB)

The EMB unit (Figure 2-24) was a business that produced and serviced urethane processing machines. The EMB unit generated a hazardous waste stream of ethylene glycol monomethyl ether (a cleaning liquid) which was collected in a satellite accumulation area. The nonhazardous waste produced by the unit included waste oil from maintenance operations, ethylene glycol and water, and diisononyl phthalate.

2.2.23 Miscellaneous Facilities

Over the years, the North Works has also had a blacksmith shop, paint shop, coopers shop, stables, electric shop, pipe shop, plate shop, machine shop, railroad barn, and various maintenance and office buildings. None of these facilities are known to have generated any significant process wastes; the major waste would have been general refuse.

This completes the description of plants and operations that have closed or been demolished. The following sections describe plants and operations currently functioning at the North Works.

2.2.24 Polyols Plant

The location of this plant is shown in Figure 2-24 (northern quarter of the facility).

Polyols are long chain polyether and polyester materials containing hydroxyl groups. They are formed by the reaction of ethylene and/or propylene oxides with polyalcohols such as glycerine or propylene glycol to form larger molecules. They are used for making urethane foam and surfactant. Several hundred different Polyol products have been produced over the years.

The original, "No. 1 Polyol Plant" (Figure 1-4) began operation in December of 1957 in the area now occupied by the current EPO Plant. This plant which had expanded over the years to a 6 reactor system, was finally shutdown in 1980. Over the course of its life, it produced a wide variety of polyol products including specialty products containing amine functional groups.

In 1964 the current "No. 2 Polyol Plant" (Figure 1-4) began operation with one reactor, No. 7. A second reactor, No. 8, was added in 1964. Both No. 7 and No. 8 produced so called "conventional" polyols. These units remain in operation.

A third reactor system, No. 9, was added in 1969. This reactor used both hexane and toluene as solvents over the course of its operation. It was shutdown in September of 1981.

In 1975, No. 10 reactor system was brought on line for the manufacture of Graft Polyol. With some modifications involving the reuse of some equipment from the old No. 9 system, the No. 10 reactor train is still in use for the manufacture of Graft Polyol.

Figures 2-21, 2-22, and 2-23 give flow diagrams for the currently-active Polyol reactor systems.

Many different chemicals have been stored and used in the Polyols plant over the years; in addition to ethylene oxide and propylene oxide, sodium hydroxide (NaOH), potassium hydroxide (KOH), styrene, hexane, toluene, acrylonitrile, toluene diamine (TDA), phosphoric acid, ethylene diamine (EDA), trimethylol propane (TMP), dimethyl formamide (DMF) are known to have been used in processing. In addition, toluene diisocyanate (TDI), methylene-bis-phenyl diisocyanate (MDI) and ethylene dichloride (EDC) were all stored in the Polyol Plant for reshipment purposes.

The principal waste from polyol manufacturing is a magnesium silicate filter cake that becomes saturated with polyol when the product is filtered. Because of the high surface area of the filter cake, the waste cake is classified as spontaneously combustible. Until 1979, this material was deposited within the North Works (SWMU F). Currently, it is collected in a roll-off box (a designated accumulation area) and disposed of off site within 90-days of generation in accordance with federal and state waste handling regulations.

The plant also generates hazardous wastes that are collected in satellite accumulation areas throughout the plant. These hazardous wastes include Busch vacuum pump oil, Jet decanter waste, MDI neutralized waste, liquid MDI, and liquid TDI. The QA Laboratory generates acrylonitrile, styrene, and spent solvents wastes.

The plant's nonhazardous waste streams include waste oil from maintenance operations, liquid polyol, solid polyol, ethylene glycol and water, and crushed glass.

2.2.25 Expanded Polyolefin (EPO) Plant

This unit is currently running in the old No. 1 Polyol Plant. The location of the EPO unit is shown in Figure 2-24. It began production in 1990. This plant takes polypropylene "mini pellets" impregnates them with butane and expands them like puffed rice to a molding bead. There are some minor amounts of tricalcium phosphate and nitric acid used in the process. The plant does not generate a hazardous waste stream, but it does generate a nonhazardous ethylene glycol/water solution from the seal of a butane gas holder. This waste stream is recycled to a facility that reclaims glycols. A phosphate containing waste water also is generated and discharged to the Wayne County POTW.

2.2.26 Pilot Plant

The location of this unit is shown in Figure 2-24 (Building 53X & 53Y). The Pilot Plant began operations in the 1940s. It has historically been used as a facility to define and develop the processes necessary to commercialize production of products invented in the research laboratories. In addition, the facility is used as a small scale production unit for products being supplied to customers on a trial basis and for products which will only be utilized on a limited basis and cannot justify the construction of a dedicated facility.

The Pilot Plant manufactured or handled a variety of materials including latex, polyols, amines, isocyanates, magnesium silicate, methanol, methylene chloride, isopropanol, PIX® (a crop growth regulator) and Basalin (a herbicide). The materials being processed varied, but no large scale volume of waste was generated from any developmental work. Documents indicate that latex, polyols, Basalin-contaminated solids, and neutralized acids and bases were disposed of on site.

As a research facility doing experimental runs, the duration of use of any one chemical normally is extremely short. However, ethylene oxide, propylene oxide and other materials involved with polyol chemistry have been used for longer periods of time. Significant sustained small scale production runs of the following materials are known to have occurred in the period indicated.

Urethane Latex - 1970s
Basalin® - Late 1970s
PIX® - Early 1980s to present

Various types of experimental polyols have been produced regularly in this facility.

Waste materials from the Pilot Plant have been as varied as the materials produced and the methods of their disposal is largely unrecorded until the advent of modern waste management practices in the late 1970s. Since that time, wastes are managed in accordance with federal and state waste handling regulations.

2.2.27 Chemical Engineering Building

The Chemical Engineering Building was built in the late 1960s. Its location is shown in Figure 2-24. Chemical Engineering conducts operations very similar to the Pilot Plant. It scales up reactions developed in labs, defines properties of new materials, and conducts wastewater studies for all divisions of BASF Corporation. It has a special reactor facility for pilot scale development of new Polyols. Like the pilot plant, numerous chemicals have been utilized in tests over the years. The facility has a segregated sewer system with non-contact waters going through Outfall 003 to the Detroit River and contact waters sent to the Wayne County POTW for treatment. Waste materials are varied, but generated in small quantities. Wastes collected in satellite accumulation areas are managed in accordance with federal and state waste handling regulations.

2.2.28 EPC (Engineered Plastics Compounding) Plant

The location of the plant is shown in Figure 2-24. It occupies that portion of the old Calcium Chloride Plant later used by the Iron Oxide Pigments operation. EPC operations began in 1988 and continues today. The operation consists of taking nylon 6, 6; nylon 6, 10; ABS and ASA copolymer pellets, adding coloring agent, reinforcing materials and metal modifiers, and extruding it into pellets for customer's molding operations. All additives are used in small amounts. The primary waste is off-spec blocks of nylon which are normally sold to a reprocessor. Process waste water goes to the Wayne County POTW. There is a dust collection system on the process air vents.

The QA Laboratory generates two hazardous waste streams that are collected in satellite accumulation areas: waste sulfuric acid and Ultradur solvent. The primary nonhazardous waste stream is waste oil from maintenance operations. Wastes collected in satellite accumulation areas are managed in accordance with federal and state waste handling regulations.

2.2.29 Elastocell Plant

The location of this plant is shown on Figure 2-24. Elastocell began operations in 1986 and continues today.

This plant manufactures urethane parts used as spring aids in automobiles. The front end of the operation reacts polyols and naphthalene diisocyanate (NDI) to form a urethane polymer. The polymer is shaped in one of several injection mold lines. The molded part is trimmed and finished prior to shipment. All chemical handling is done in areas with spillage containment. The primary nonhazardous waste is off-spec molded urethane which is taken off site for either grinding and alternative use or landfilling. The plant's other nonhazardous wastes include waste oil from maintenance operations, white mineral oil from the mold line, additive component waste, polyurethane prepolymer, and spent N-methylpyrrolidone solvent.

The plant generates two hazardous waste streams: spent dibutylamine and dimethylformamide solvent mixture and waste QA lab solvent. Both waste streams are collected in designated satellite accumulation areas where they are managed in accordance with federal and state waste handling regulations.

2.2.30 Steam Facility

This facility is located in the south end of the Kreelon Building at the north end of the North Works. It is located in Figure 2-24. This unit burns natural gas in four boilers; the boilers have #6 fuel oil alternate-firing capability. The fuel oil is stored on the site in a diked tank. Sulfuric acid and caustic for regenerating the water treatment units are stored outside in diked tanks. Two boilers are equipped to burn butane recovered from the EPO plant. The only significant waste material from this facility is the "hard" regeneration water from the deionizer beds that is neutralized and released through Outfall 001. The facility also generates nonhazardous alumina desiccant and a non-hazardous waste machine oil.

2.2.31 Corporate Research and Development Complex

The Corporate Research and Development Complex is broken down into three (3) areas: (1) Central Research and Development Laboratories, (2) Plastic Application Center (PAC), and (3) Urethane Applications.

The three research facilities are located on the western edge of the North Works along Biddle Avenue (Figure 2-24). Central Research was built in the late 1940s. It has and currently functions as a major research laboratory for all segments of BASF, not just those operations based in the North Works. The types of chemicals handled over the years in this facility vary widely. In general, however, no material is used in volumes over a few gallons. For the most part, waste and disposal of excess chemical were controlled by established research department protocols.

The Research and Development (R&D) Laboratories consist of the following departments: Fine Chemicals, Colorants, Specialty Products, Urethanes, Isocyanates, Polyols, Polymer Physics, and Automotive and Energy Chemical Applications.

These R&D activities result in the generation of various nonhazardous and hazardous waste. Hazardous waste is collected within the laboratories in designated satellite accumulation areas consisting of containers less than or equal to five (5) gallons in capacity. The hazardous waste streams include waste pyridine, methylene-bis-phenyl diisocyanate (MDI) and toluene diisocyanate (TDI), solvent contaminated solids, amines and solvents, MDI in monochlorobenzene, polyols and solvents, and waste lab solvents. The nonhazardous waste includes solid and liquid polyol, vacuum pump oil and crushed glass.

The Urethane Applications Lab was built in the late 1970s. It is dedicated to urethane chemistry, the measurement of the physical properties of urethane, and the development of urethane manufacturing technology. The Urethane Applications Lab generates waste urethane resin and waste MDI and TDI which are collected in satellite accumulation areas throughout the unit. The nonhazardous waste is comprised primarily of waste oil generated from maintenance operations.

The Plastics Application Laboratory (PAC), was completed in 1990. It serves a function similar to that of the Urethane Lab for non-urethane plastics. The PAC generates two hazardous waste streams which are collected in designated satellite accumulation areas. These hazardous wastes include spent sulfuric acid and lab solvents.

Both nonhazardous and hazardous waste from satellite accumulation areas within the corporate R&D complex are transferred to a less than 90 days accumulation area, known as the R&D Waste Crib (SWMU B). The contents of the satellite containers are transferred into one of the following nine containers located in the R&D Waste Crib:

- waste pyridine,
- methylene-bis-phenyl diisocyanate (MDI) and toluene diisocyanate (TDI),
- solvent contaminated solids,
- amines and solvents,
- MDI in monochlorobenzene,
- polyols and solvents,
- waste lab solvents,
- solid polyol, and
- liquid polyol.

2.2.32 TPU Synthesis Plant

The location of the TPU (Thermoplastic Polyurethane) plant is shown in Figure 2-24. The plant began operations in July, 1991.

The process utilizes polyol (polydiol) 1,4-butanediol, stabaxol and monomeric MDI which are carefully premixed in dosing machines. The resulting mix is allowed to react on a temperature controlled belt inside a tunnel. The resulting cast slab of urethane is cut to a final size. It is stored in special silos where the reaction slowly continues for a specified "maturing" period.

Several different grades of similar TPU elastomer product are produced. Finished product is shipped in pellet form. Raw material supply and product shipment are primarily by truck. TPU is used for auto components, air bags, recreational equipment, and female condoms.

The only hazardous waste generated in the TPU plant are the materials generated by the Quality Assurance Laboratory. This waste includes various spent solvents including dimethylformamide which are collected in a satellite accumulation area in volumes of less than 5 gallons. Nonhazardous waste streams include monomeric MDI, off-specification TPU polymer, oil, polyesterdiol, and diisodecyl adipate.

2.2.33 Vitamins Complex

The location of the Vitamins Complex is shown in Figure 2-24. The Vitamin E Plant was constructed in the mid 1970s to produce synthetic Vitamin E via a proprietary process. The Vitamin E synthesis uses heptane, methanol, anhydrous hydrogen chloride, zinc chloride, acetic anhydride and vitamin precursors.

The Vitamin A Powder Plant was built later; it utilizes Vitamin A oil and absorbs this oil on various substrates, such as cornstarch and expanded silica, to produce a powdered product suitable for dry blending.

In addition to Vitamin A and E production, a Food Blends facility was constructed during the late 1980s to produce blended food additives. Vitamin products are produced for both human and animal nutritional use. All three plants operate according to FDA standards. Vitamin A Powders and Food Blends do not produce hazardous wastes.

As a result of wastewater treatment, the Vitamin E plant generates a Michigan hazardous waste Zinc Hydroxide Filter Cake (003D) which is collected in a roll-off box designated as a less than 90-day accumulation area. This wastewater treatment process was replaced with in-process recovery for reuse off-site in 1995; however, the former process is being maintained as a back-up temporarily. The plant also generates the following hazardous wastes which are collected in satellite accumulation areas throughout the plant. These hazardous wastes include QA Lab solvents, mineral oil for nitrogen padding of chemical storage tanks and process waste. Wastes collected in satellite accumulation area are managed in accordance with federal and state waste handling regulations.

The plant's nonhazardous waste streams include waste oil from maintenance operations, ethylene glycol and water, paper and rags contaminated with vitamin oil, and solid and liquid off-specifications vitamins.

2.2.34 Polystyrene Pilot Plant

The location of the Polystyrene Pilot Plant is shown on Figure 2-24 (Building 53W). The plant began operations in April 1994. The Plant was designed to polymerize a mixture of styrene, ethylbenzene, polybutadiene, rubber, and mineral oil for R&D purposes. The process consists of one 150 gallon dissolver tank, one 200 gallon feed tank, two stirred tank reactors, two poly flow reactors and a flash devolatilizer. The polymer strands produced from this operation are cooled in a water bath and then pelletized.

The Plant generates lab solvents, styrene, ethyl benzene, off-specification polystyrene, and flame retardant hazardous waste streams, and they are placed in designated satellite accumulation areas.

<u>Summary</u>

Several manufacturing processes were used at the North Works facility. Prior to the late 1970s, the facility produced bulk inorganic commodities; these included soda ash, sodium bicarbonate, calcium chloride, and calcium carbonate. Production was supported by other plants on site, notably a foundry and a coke plant. Residuals primarily from the coke plant, the foundry, and the soda ash complex were used to fill in low areas and to reclaim marsh land. This practice stopped with the advent of modern waste management practices in the late 1970s and with reconfiguration of the facility to smaller specialty plants.

2.3 REGULATORY STATUS

Chemical waste is generated at the BASF Corporation North Works Facility as a result of manufacturing processes, off-specification materials, or spills. With the exception of bulk waste streams, most of these wastes are collected in 5 to 55 gallon containers at the point of generation.

Full containers of nonhazardous and hazardous wastes are transferred to the central waste accumulation storage building (Bldg 55M on Figure 2-24) managed by the Facility Ecology Services Department. As needed, arrangements are made for removal and disposal at Corporate-approved treatment and/or disposal facilities.

The Michigan Department of Natural Resources (MDNR) is the leading government agency responsible for implementing the Hazardous Waste Management Act (Act 64). The MDNR is also responsible for those provisions of the Resource Conservation and Recovery Act (RCRA) for which the Environmental Protection Agency (EPA) has given Michigan authorization.

The Facility is a non-permitted large quantity generator (i.e., less than 90-day storage). The Facility's less than 90-day, non-permitted, hazardous waste areas include five (5) designated hazardous waste accumulation areas. Approximately 50 satellite accumulation areas exist.

The Facility once operated a 25,300 gallon capacity container storage area for which it obtained interim status. This area is known as SWMU A. The SWMU has been closed and replaced by a new building (55M) built specifically for hazardous waste accumulation (for less than 90-days). A chronology of events associated with the Facility's Interim Status is outlined in Section 2.3.2.

2.3.1 Waste Management Procedures

BASF developed Plans and Guidelines that define operational procedures for proper waste management at the North Works Facility. The Ecology Services Department provides this information to designated unit waste coordinators who are trained annually. The plans and guidelines are discussed below.

"Management of Chemical Wastes" is a BASF Standard Practice Bulletin (SPB #19) that outlines procedures for generators of hazardous and nonhazardous chemical waste. These procedures cover: a) hazardous waste satellite storage area requirements; b) hazardous waste accumulation storage area requirements; c) facility central waste accumulation storage area; d) nonhazardous waste storage area requirements; e) rejected off-specification chemicals; f) waste shipments and manifesting; g) treatment of hazardous waste; h) spill procedures; and i) employee training.

A Hazardous Waste Contingency Plan was prepared for the North Works Facility to establish the necessary planned procedures to be followed in the event of an emergency such as explosion, fire, any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents to the air, soil, or surface water; or any act of nature such as a flood or severe weather. The plan is designed to protect and minimize the hazards to BASF Corporation employees, properties, the general public, and the environment.

The facility has approximately 120 hazardous waste streams and 60 nonhazardous waste streams. Accurate waste stream characterization and documentation are the bases of the properly-functioning waste management program. All waste streams are evaluated according to the requirements set forth under Michigan Act 64 and RCRA to assess if the solid waste is a hazardous waste. A Waste Data Sheet exists for each waste stream, and it documents the waste characterization information. In addition, the Ecology Services Department maintains a computer database to track nonhazardous and hazardous waste manifests.

2.3.2 Hazardous Waste Interim Status History

The chronology of events associated with Interim Status for the Facility are as follows:

- November 18, 1980 Submittal of original Part A application to EPA, Region V which included the following units:
  - 25,300 gallon capacity container storage area,
  - 100 cubic yard capacity container storage area,
  - 4,000 gallon aboveground tank, and
  - 2 million gallon per day surface impoundment.
- April 8, 1981 Part A application amended by BASF to delete 2 million gallon per day surface impoundment.
- June 25, 1981 Part A application amended by BASF to include an incinerator.
- August 6, 1981 BASF received confirmation from EPA that the surface impoundment was deleted from the Part A application.
- June 10, 1982 BASF was granted Interim Status by EPA. The Part A included the following units:
  - 25,300 gallon capacity container storage area,
  - 100 cubic yard capacity container storage area,
  - 4,000 gallon aboveground tank, and
  - incinerator.
- December 1982 BASF decommissioned and dismantled the incinerator.
- August 24, 1984 EPA requests clarification on status of incinerator; operating permit may be required.
- September 5, 1984 BASF informs EPA that the incinerator no longer exists; requests that EPA delete incinerator from Part A.
- February 26, 1988 MDNR called-in BASF's Part B.
- June 28, 1988 Original closure plan submittal date.

- September 30, 1988 BASF requests extension of closure plan submittal date to October 25, 1988.
- October 5, 1988 BASF requests confirmation of incinerator deletion from Part A application.
- October 11, 1988 BASF requests that the MDNR delete 100 cubic yard capacity container storage area and 4,000 gallon aboveground tank from the Part A application.
- October 13, 1988 BASF receives confirmation from MDNR that incinerator was deleted from Part A application.
- November 8, 1988 BASF submitted closure plan for 25,300 gallon capacity container storage area.
- June 27, 1991 BASF receives confirmation from the MDNR of closure for 25,300 gallon capacity container storage area.

2.3.3 1986 Michigan Consent Decree

In 1986, BASF Wyandotte Corporation entered a Consent Decree with the Michigan Attorney General to address groundwater concerns at both the North Works and South Works. DNR studies during the early 1980s found contaminated soils and groundwater at the North Works (Table 2-2). Since the major cause for concern was migration of the contaminants into the Detroit River, an overall approach of groundwater control was developed to prevent the flow of contaminated groundwater from reaching the Detroit River. A groundwater study was conducted by S.S. Papadopulos & Associates, Inc. (SSP&A 1984), and based on this information, a control plan was developed and submitted to the State of Michigan. This plan was accepted as the basis for corrective action.

The 1986 Consent Decree specifies remedial measures for the North Works as follows: (1) operate and maintain groundwater extraction wells and a treatment system for 30 years or until demonstrating that required concentration levels (in general, less than the detection limit) in each monitoring well have been achieved and (2) demonstrate that an inward hydraulic gradient toward each groundwater extraction well exists that is adequate to halt the flow of contaminated groundwater to the Detroit River. Monitoring requirements include (1) periodic measurements of water levels in piezometer and extraction wells, (2) sampling and analysis during years 26 through 30, and (3) sampling and analysis to demonstrate intent to discontinue.

Groundwater Remediation System

Fifteen 6-inch diameter groundwater extraction wells were installed in February, 1986 and replaced in June, 1988 (Figure 2-27). The replacement was necessary to alleviate decreasing well yields and to reduce the amount of sand entering the wells. Typical construction details are shown in Figure 2-28.

In addition to the 15 extraction wells, 9 monitoring wells and 7 piezometers were installed to evaluate the system's performance. These wells are 2-inches in diameter. Typical construction details are shown in the Figure 2-29.

Groundwater from each of the extraction wells is transferred by a central vacuum pump system with liquid ring seals to a surface knock-out tank where solids fall out. Each well operates on high/low automatic level control using electronic controls.

The primary elements of the treatment system are 2 downflow pressure vessels, each containing approximately 20,000 pounds of granular reactivated carbon. Groundwater is pumped to the carbon adsorption treatment system using centrifugal pumps with mechanical seals. Typically, the carbon beds are operated in a series configuration with the least-contaminated bed in the secondary position. Discharge from the primary bed is sampled weekly and analyzed for methylene chloride, chloroform, dichloroethane, and 1,2-dichloropropane (also called propylene dichloride or PDC).

Treated water from the carbon adsorption treatment system is discharged to the Wayne County POTW in accordance with permit number D-11311.

2.3.4 Permits

There are several permits related to the North Works Site that regulate activities which have environmental impact. These permits are issued and enforced by different governmental agencies that have assumed primacy for these activities.

Outfalls 001, 002 and 003 are surface water discharges to the Detroit River that are regulated by NPDES permit MI0000540. The permit is issued and enforced by the Michigan Department of Natural Resources (MDNR). Five outfalls were originally regulated under this permit that was first issued on December 19, 1974. In the late 1970s, BASF was granted permission to divert Outfall 004 to Outfall 005. Outfall 005, which served the soda ash plant, was then taken out of service in 1978 when the soda ash complex ceased operation. The NPDES permit has been re-issued several times since the 1970s with the present permit having an issuance date of August 19, 1993 and an effective time period from December 1, 1993 to October 1, 1997 (Appendix F, Exhibit 1).

The outfalls presently service different parts of the North Works Site. Outfall 001 is the discharge for the Polyols and EPO Plants; Outfall 002 is the discharge for the TPU Synthesis Plant; and Outfall 003 discharges non-contact cooling water and stormwater collected from portions of the North Works.

Several excursions of permit limits have been documented. Appendix F, Exhibit 2 lists NPDES excursions since 1985. In addition, a notice of non-compliance was issued in 1977 for exceedances of total suspended solids (TSS), total residual chlorine (TRC), total lead and pH at outfall 003 and a separate non-compliance notice on May 1, 1990 regarding toluene limitation exceedances at Outfall 001 (Appendix F, Exhibit 3).

Other events at Outfalls 001 and 003 have been reported to the MDNR by BASF as required in the permit. Outfall 001 has had four events in which it either received wastewaters not specified in the current NPDES permit or had waste water bypass the carbon absorption treatment system. Only once did this type of event result in a permit exceedance. At Outfall 003 there were several reports of foaming made prior to 1992. The foaming problem was investigated by both the MDNR and BASF in 1992, and the problem was mitigated by extending the discharge chamber into the river to reduce turbulence.

Several studies related to the regulated discharges have been performed. These include a 1980 USEPA analysis of Outfalls 001, 002, 003 and the Detroit River (Appendix F, Exhibit 4); a 1981 study by the MDNR Environmental Protection Bureau comparing intake water with outfalls 001 and 003 (Appendix F, Exhibit 5); a 1981 bio-monitoring study of effluent from outfalls 001 and 003 (Appendix F, Exhibit 6); and self-monitoring results from January 1987 through February 1995 (Appendix F, Exhibit 7).

Another permit regarding water discharge has been issued by the Wayne County Office of Public Works under Permit D 11311. This permit includes allowing the discharge of treated water from the North Works Groundwater Collection and Treatment System to the sewer system that leads to the Wayne County POTW. This permit includes quarterly monitoring requirements for methylene chloride, chloroform, dichloroethane, propylene dichloride, ethylene dichloride, fats, oil and grease, total nickel, total zinc, total phosphorus, TSS and pH. Semiannual testing is required for many additional organic analytes as specified in the permit (Appendix F, Exhibit 8). BASF provides quarterly compliance reports with the results being passed on to the permit authority for compliance verification. Examples of data reported in April, 1994 are included in Appendix F, Exhibit 9.

Few excursions have been documented since the permit was first issued on January 25, 1982. POTW excursions since 1987 are included in Appendix F, Exhibit 10.

Sampling has been performed for internal BASF and regulatory agency evaluation at the groundwater extraction system. These studies include a sampling event performed by BASF in June, 1987 for submittal to the MDNR (Appendix F, Exhibit 11); an internal BASF Quality and Pollution Control Analytical Requisition in 1988 (Appendix F, Exhibit 12); and bar graphs of groundwater contamination treated by the North Works Groundwater Treatment System (Appendix F, Exhibit 13). Self-monitoring result logs for the North Works Extraction Wells were submitted to the RCRA Enforcement Branch (Region V) in response to an information request under Section 3007. The data covered the period July 1987 through December 1992, and they were submitted on January 8, 1993.

Air emissions at BASF are regulated by the Wayne County Air Pollution Control Division. BASF has many current operating permits. A summary of the permits is contained in Appendix F, Exhibit 14. Equipment that historically had operating permits that are no longer in use is contained in Appendix F, Exhibit 15.

2.4 SPILL HISTORY

A summary of historical product and waste spills at the North Works is provided in Tables 2-3 and 2-4. Examples of reports detailing spills are contained in Appendix G.

Table 2-3 represents a summary of spills/releases that were reported to a government agency. Table 2-4 represents a summary of spills/releases that potentially were released to the environment but not reported and were not required to be reported.

Most spills were contained and cleaned up immediately; however, two of the largest spills are being treated as areas of concern during this RFI (propylene oxide spill - AOC 9 and styrene spill - AOC 8).

2.5 BURIED PIPELINES

There are thousands of feet of buried pipe at the North Works. Brine, water, sewer, process and other miscellaneous pipelines were buried routinely until about 1986. These pipes were made of wood, clay, cast iron, steel, stainless steel, fiberglass, concrete and other materials as well. Records exist for some of these lines; records do not exist for many of the lines. The process of abandonment ranged from merely cutting the lines to cementing and removal. Many of the old lines have caved in or plugged. There may be migration channels within the North Works along these abandoned pipelines if a suitable force can drive a fluid. In general, there is seldom much driving force unless one end of the line has an open discharge to an existing sewer or manway.

Existing underground sewer lines are shown in Figures 2-30 and 2-31. Currently, there are no underground process lines except for less than 60 ft of a #6 fuel oil line at the Steam Facility. This line is below grade and in a concrete trench with removable covers.

Some past underground lines that left the North Works are of note:

Distiller Blow Off (DBO) waste lines to Fighting Island -- These lines left the North Works and crossed the Detroit River to the settling ponds on Fighting Island. Several lines existed over time, and they dated from the 1940s. In the early 1980s, all remaining lines were cut below river bottom, cut again inland of the dock, and had the intervening 10 to 20 ft of pipe removed to eliminate any migration path. Inland DBO piping was removed during the Soda Ash Plant demolition.

Old Water Inlet Line -- An early river water inlet line ran from the river of the existing Pilot Plant. Drawings indicate this line had been cut and blocked by 1958.

Coke Oven Gas Line - This line was used to transport Coke Oven Gas to the South Works. Its use was abandoned in 1965. By about 1968, the line was deemed incompetent when it failed a hydrotest. Since the late 1960s, sections have been dug up and cut numerous times within the North Works. There is no information available on any abandonment procedures for this line.

Propylene Oxide Line - until the early 1980s, a 4 inch pipeline carried propylene oxide to the Polyols Plant from the South Works. It was constructed of polyethylene jacketed steel with a cathodic protection system. This line was cleaned thoroughly and abandoned under a nitrogen pad in the early 1980s.

The North Works also had several outfalls that are not used currently. These outfalls were blocked prior to the demolition of the Soda Ash Complex in the early 1980s. Examination of the river dock by a diver in the 1980s found no active opening to the river except for the permitted outfalls existing at the time.

3.0
ENVIRONMENTAL SETTING

3.1 Climate

The southeastern Michigan region where the facility is located experiences a mid-continental climate, with cold winters and relatively short, hot summers that are regionally moderated by the Great Lakes. The average first frost is October 21 and the average last freezing temperature occurs on April 23. The annual growing season is 180 days. Precipitation averages 30 inches per year, including 16 inches of snow (DNR & OME 1991). Prevailing winds are from 251° west-southwest, and average 9.7 mph. A wind rose exhibiting direction as a percentage of time is included (Figure 3-1).

3.2 Ecological Systems

Major habitat types located in and adjacent to the North Works facility include grassland, wetlands, and the Detroit River. Vegetation at the facility is homogeneously distributed and of low diversity, consisting primarily of pioneering grass and weeds (e.g., wild carrot, clover, dandelion and wild strawberry). Open fields have been seeded with grass and have since been invaded by pioneering weed species. This is a result of the poor soil quality (fill with a high pH) rather than from continuing releases.

Shrub and tree species at the facility include primarily planted ornamental varieties. The highest diversity of vegetation appears along the shoreline, consisting primarily of invading stress tolerant weed species (i.e., American elm, cottonwood, box elder, willow, dogwood, goldenrod, asters, red-osier, gray dogwood, sumac, deadly night shade, reed grass, wild grape, and wild rose).

Wildlife usage of the facility appeared to be primarily avian: gulls, Blue Heron, Canadian Geese, and mourning doves. Personnel working at the North Works have observed large populations of rabbits and woodchucks. Other species such as coyote, deer, and snowy owls have been seen on the property but are believed to be transients. Overall, site conditions are not desirable for habitat because of low cover and few food sources.

No wetlands or other environmentally sensitive habitats exist at the facility, although wetlands are present in other areas along the Detroit River. Rare, threatened or endangered plant or animal species have not been observed at the facility (ERM, 1991).

The Detroit River is the largest habitat potentially affected by the North Works. The river connects to Lake St. Clair with Lake Erie (Figure 3-2). Flow in the river is complex due to numerous islands and channels particularly in the southern half of its length, and to effects from fluctuating water levels in Lake Erie. The river is approximately 2,500 to 5,000 ft wide, and drops 3 ft over its 31.7-mile length. The depths in the channels range from 30 to 50 ft. Retention time averages 21 hours, and the average flow rate is 185,000 ft^3/sec.

The facility lies directly on the Trenton Channel harbor line which is maintained by the Corps of Engineers to a depth of approximately 26 ft. The bottom sediments can be subjected to regular scouring from the propeler wash of passing freighters.

The river contains approximately 31 coastal wetland and submersed macrophyte (plant) beds (Manny et al, 1988), covering a total of 1382 ha (Figure 3-3); approximately half of this area lies in Michigan and half in Ontario. At least 20 species of submersed macrophytes are present in the river. The wetlands and submersed macrophytes constitute critical habitat for plants, fish, and birds.

The Detroit River fish population is a mixture of natural and introduced species most of which are warm water species. Introduced species include the common carp, rainbow smelt, alewives, sea lamprey and white perch. Approximately 60 natural species either reside, spawn or migrate into the river half of which use mainly the lower river along the islands and the mainland shoreline for spawning (DNR & OME 1991).

3.3 HYDROLOGY

Surface water and groundwater flow was naturally east toward the Detroit River. Groundwater is influenced by surface water drainage, river stage, glacial landforms and the 15 extraction wells located within North Works.

The estimated total discharge of groundwater from the Michigan side of the Detroit River from Belle Isle to Point Mouillee is between 53 and 106 cfs. Rates of groundwater seepage are highest in the northern portion of the Detroit River near Belle Isle, and generally decrease downstream, increasing again below the Ecorse River mouth. Groundwater and surface water systems are highly interconnected in the Trenton Channel and the lower Detroit River, due to thin or absent sediments overlying bedrock (MDNR & OME, 1991). Groundwater discharge from the North Works facility is small because the groundwater extraction system and the steel retaining wall erected along 50% of the Detroit River bank reduces and possibly eliminates natural groundwater discharge. There is no discernible floodplain.

Site Drainage

Water leaves the North Works site through several pathways. These pathways include regulated Outfalls 001, 002 and 003, and the Wayne County sewer system, and surface water flow.

BASF graded the North Works to enhance drainage on the facility and reduce run off. In general, run off is controlled well on the north half of the facility and some run off may occur on the undeveloped south half of the facility.

Small quantities of water may also leave the site by diffuse flow to the Detroit River along the portion of the waterfront that does not have a steel retaining wall and by flow patterns across the north boundary near Perry Place (SSP&A, 1984); although, this flow may have been eliminated by the installation of groundwater extraction system.

3.4 GENERAL SITE GEOLOGY

The surface strata is composed of up to 22 ft of industrial fill. The extreme western edge of the North Works bordering Biddle Avenue was well-drained during the late 1800s. The extreme eastern edge of the North Works, bordering the Detroit River, was marshland. Fill from a variety of sources, but primarily industrial residues generated on site, was deposited to raise the entire site to its present grade. This fill varies in nature from alkaline lime waste to acidic fly ash and cinders. The fill includes some deposits of relatively clean sand and clays but also includes metal, wood and masonry debris. In most cases, the beginning of the fill layer is sharply defined because visible evidence of the original marshland bottom vegetation is detectable.

In general, the fill rests on peat or organic clays that were the marsh bottom deposits. Where it occurs, the peat ranges up to 3 ft thick and occurs approximately 5 to 10 ft below grade depending on location.

The layers below the peat (or below the fill where the peat is absent) are interbedded sands and clays. Sand is prevalent under the western portion of the facility, and it grades into clays eastward. Glacial lacustrine clay underlies the sands.

The clay was deposited during the latest interglacial stage when lake levels were higher than they are today. This clay has low permeability and effectively segregates groundwaters in the fill and sand from water-bearing zones below. Figure 3-4 is a typical cross-section of the upper strata.

At a depth of approximately 70 ft, there is a 150-ft thick bed of dolomite (Dundee or Detroit River Group). The water present in the dolomite has a high sulfur content rendering it unfit for consumption. Below the dolomite, there is a 100-ft, layer of sandstone (Sylvania) and then various interbedded layers of limestone, sandstone, gypsum and salt to depths of 1500-ft (Figures 3-5, 3-6, and 3-7).

The presence of the heterogeneous fill makes groundwater flow within the North Works complex. However, the effective isolation of the upper groundwaters from any lower aquifers effectively eliminates vertical migration except for the potential at wells which penetrate between layers.

Brine Wells and Disposal Wells

The North Works was developed to manufacture Soda Ash via the Solvay Process. The fundamental raw material required for this process was salt (NaCl) brine. The bedded salts underlying Wyandotte offer good sources of this brine. Wells were drilled and the salt extracted by solution mining. Numerous brine wells were drilled on the site over the years. Figure 3-8 is believed to be a complete inventory of wells known to exist up to 1949. Figures 3-5, 3-6 and 3-7 give typical details for the wells. No new brine wells were drilled in the North Works after 1949; brine production had shifted to Grosse Ile.

All brine wells are plugged. By the late 1940s, measurable subsidence had been detected, and there was an active program to monitor and control it. Plugging wells and discontinuing solution mining were part of this program.

In addition to the brine wells, two water wells were drilled into the sulfur water aquifer (Detroit River Group) during the early 1970s. The location of these wells is shown in Figure 3-9. The water produced was used for cooling. One well was used for water extraction and the other for reinjection of the water back into the same aquifer. The injection well was registered with the State of Michigan. The paper work necessary to close and cement these wells is currently in process.

In 1966, an experimental well was developed at the location shown in Figure 3-9 to test the feasibility of underground disposal of DBO from the Ashplex. Apparently, this effort was abandoned after only a short trial. There is no record of the cementing of the well, but it seems probable that it was cemented consistent with the practice for the other wells at the North Works.

During the mid-1960s, a well for the underground storage of PDC was also developed at the location shown in Figure 3-9. A brine cavity was developed at approximately 1500 ft below surface, and the PDC was injected to displace the brine in the cavity. There was significant spillage associated with the transfer operation to this disposal well (AOC 5). Unrecovered PDC remains in the salt bed under the site. While no records exist, reportedly the well was closed and cemented in the late 1970s.

3.5 HYDROGEOLOGY

Hydrogeologic investigations (SSP&A, 1984) at the site demonstrate that the surficial materials underlying the site are non-homogenous with extensive areas of low transmissivity. The general area of lowest transmissivity is the east central part of North Works (SSP&A, 1985).

3.5.1 Factors Influencing Groundwater Gradients

Since installation of the groundwater collection system, groundwater exhibits gradients toward extraction wells. Extraction rates were initially as predicted but have decreased somewhat over the past several years. During calendar years 1987 through 1993, 20 million gallons of groundwater and the equivalent of 21,000 gallons of PDC have been extracted through the groundwater collection system.

In addition to the groundwater extraction system, several factors may have influenced the natural groundwater flow pattern across the North Works since the original groundwater study was conducted:

1. Approximately 50% of the river frontage has been sheet piled to a depth of 35 feet. The remainder is planned for sheet piling within the next few years. The primary purpose of this piling is dock stabilization, but it should redirect the groundwater flow path to the river.

2. Much of the underground stormwater drainage piping on the site has been replaced with welded joint construction. Infiltration of groundwater into the storm drain systems has been reduced significantly for much of the North Works. This system upgrade reduces the groundwater directly transported to the river via Outfall 003.

3. Surface contours have been changed through grading operations at the North Works. The changes promote internal drainage.

3.5.2 Artesian Conditions

Bedrock underlying the North Works Facility is Silurian to Devonian in age. The facility is close to areas known to contain flowing artesian wells completed in Silurian-Devonian aged rock units (Allen, 1977). Groundwater from bedrock units under the facility is under artesian conditions.

Silurian-Devonian age rock units contain flowing artesian wells in the southeastern corner of Michigan. Where both Silurian and Devonian rocks exist, they are hydraulically connected and are considered to be a single unit. The rocks are composed of limestone and dolomite and are as thick as 800 feet. The top 100 to 200 ft of the Silurian-Devonian rocks may contain fresh water.

Many flowing wells exist in Monroe County (12 miles south of the North Works). Well depths range from 54 to 475 feet, the head ranges from 1 to approximately 5 feet above land surface, and the yield ranges from 10 to 40 gpm. The quality of water obtained from these wells can be good; however, in many areas the water is saline. The hydrogeologic conditions at the North Works could be influenced by these artesian conditions if old brine wells allow hydraulic communication with the near-surface sediments.

3.5.3 Groundwater Use

Groundwater is not used as a source of potable water in this area; and there are no potable water wells in Wyandotte. BASF has used high-sulfur groundwater for non-contract cooling water in the transparent iron oxide plant. This use was discontinued.

3.6 GROUNDWATER MONITORING PROGRAMS

Groundwater monitoring occurs indirectly through testing of permitted Outfalls 001 and 003 as specified in permit MI0000540 and directly through self-monitoring of the groundwater treatment system that discharges to the Wayne County POTW. The outfalls have as part of their source groundwater seepage while groundwater collected in the pre-treatment system is frequently monitored as a condition of Permit D 11311 issued by the Wayne County Office of Public Works.

In accordance with the 1986 Consent Decree, water levels in groundwater monitoring wells, piezometers, and extraction wells are measured on a quarterly schedule. Groundwater contour maps indicate that the extraction wells have created inward gradients across much of the facility.

There is not a program for routine chemical analyses of groundwater from individual monitoring wells. At the groundwater treatment system, sampling and analyses are performed on the influent (extracted groundwater) and the effluent from each carbon bed.

The samples are collected from the combined flow of all extraction wells; individual well streams are not analyzed. Analytical parameters include: PDC, chloroform, dichloroethane, and methylene chloride.

3.7 SEDIMENT QUALITY

The following section was prepared almost entirely from the Detroit River RAP (DNR & OME, 1991) and the Connecting Channels Study (UGLCCS, 1988). Those reports have been quoted liberally.

3.7.1 Occurrence of Sediments

The bottom of the Detroit River is composed of materials ranging from very fine silty clay to bedrock. Most of the river bottom is covered with varying thickness of silt, clay, sand, or gravel, but some sections are limestone bedrock. Sediment thicknesses over bedrock reach a maximum thickness of approximately 100 ft near Belle Isle. Thicknesses decline steadily southward to nearly zero in the Trenton Channel which fronts the BASF facility and zero in the main channel. The deep mid-river section between Belle Isle and Fighting Island is consolidated glacial clay.

The velocity of the currents dictate the bottom constituents in other areas. For instance, backwater and protected areas near the shoreline are dominated by silty clay ooze, while the majority of the mid-section of the Trenton Channel, which has a moderate velocity, is fine gravel or medium sand. River sediments continuously shift and change in areas where velocities are moderate to high and where passing freighters stir sediments, resulting in shoaling in the dredged navigational channels and considerable downstream sediment transport.

Detroit River average main channel velocities are 0.50 to 0.90 m/sec, but surface velocities may be nearly twice that rate in the main channels (0.9 to 1.2 m/sec). Sand is transported in the main channels when the velocity exceeds 0.42 m/sec, while along the shore and in shallow water areas, where velocities may drop to 0.25 m/sec or less, sand deposition occurs. Navigation channel bottoms are scoured by currents and few sediments are left to resuspend.

Sediment quality is important to the shipping industry since dredging is periodically required to maintain shipping channels, boat slips and berths. Dredging activities in the Detroit River were estimated to produce 420,000 cubic meters of dredged materials. Disposal of the dredged sediments is dependent on contaminant levels in the dredged materials. Navigational dredge material is disposed of by the U.S. Corps of Engineers primarily at Pointe Mouillee, a confined disposal facility; however, since 1970, about 3,100 m^3 of polluted dredged materials were placed on Grassy Island. Rouge River sediments, since 1950, also have been placed on Grassy Island. Mud Island, a small containment site near Grassy Island, also was used for dredged material disposal. These islands are upstream from the North Works.

3.7.2 Summary of Sediment Contaminants

Sediments from certain sections of the Michigan shoreline appear to exhibit higher concentrations of particular contaminants than others; however, many of the contaminant distributions overlap considerably. Generally, contaminant concentrations are substantially greater along the Michigan shoreline, compared to the mid-river and Ontario shoreline sectors. Additionally, the Michigan shoreline from the Rouge River southward through the Trenton Channel appears to have the greatest overall contaminant levels.

Great variability in contaminant levels exist within small areas. For example, substantially lower contaminant concentrations exist on the Grosse Ile portion of the Trenton Channel compared to the Michigan mainland portion. Similarly, contaminant distributions in sediment are reflective of the combination of discharge and hydrological effects. Because there is little lateral mixing in the Detroit River, and particularly for the Trenton Channel, contaminants have been deposited in sediment according to long-shore water flow. This pattern was demonstrated by dye tests near the mouth of the Rouge River. Figure 3-9a shows the limited lateral mixing and the highest concentrations flowing into the Trenton Channel.

3.7.3 Indicators of Sediment Quality

Sediment quality impacts aquatic organisms that live in or near the sediments, and other aquatic life that consumes plants or benthic aquatic organisms. Sediments with high levels of contaminants or low oxygen concentrations can be toxic to aquatic life.

Contaminated sediments are not necessarily an impairment to beneficial uses (an impaired use). Contaminated sediments could potentially cause impaired uses in the river if they can result in:

- toxicity to plants, benthic organisms, near-bottom zooplankton or fish larvae or eggs; or
- bio-uptake of contaminants resulting in:
  - (a) toxicity to aquatic organisms via the food chain; or
  - (b) bioaccumulation of contaminants in fish resulting in fish tumors or restrictions on fish (and wildlife) consumption; or
- movement of contaminants into the water column such that contaminant levels exceed appropriate standards/ objectives; or
- restrictions on the disposal of dredged sediments.

Evaluating sediment contaminant levels in terms of identifying impaired uses is a difficult and perhaps impossible task because defensible chemical-specific sediment quality criteria have not been developed.

The U.S. EPA Region V Guidelines for the Classification of Great Lakes Harbor Sediments, typically are used as a preliminary indicator of sediment quality; the Guidelines are used with other methods to determine appropriate disposal options for dredged materials. The Guidelines are not intended to identify acceptable levels of contaminants in sediments such that aquatic life will be protected.

3.7.4 Impairments

This section summarizes the impairments to beneficial uses of the Detroit River sediments as described in the Detroit River RAP. The beneficial uses were presented in the Great Lakes Water Quality Agreement (GLWQA).

Restrictions on Dredging Activities

This use is impaired; however, there are no criteria in the GLWQA for acceptable levels of contaminants in sediments or legally enforceable criteria. In the absence of any criteria the River RAP used guidelines for the disposal of dredged materials to judge sediment quality. These guidelines indicate that dredging activities in the Detroit River are impaired. On a site specific basis, sediments removed may be subject to disposal restrictions and may not be suitable for open water disposal (e.g., may require confined disposal).

Dredge spoils from the entire Michigan shoreline except at the head of the Detroit River may not be suitable for open water disposal based solely on the concentrations of metals in the sediments.

Median PCB concentrations in sediments were highest between the tip of Belle Isle and Ecorse where sediments exceeded the EPA's guidelines for PCB (10 mg/kg) in localized areas. Sediments along the entire Michigan shoreline exceed 0.05 mg/kg for PCBs.

Median oil and grease concentrations exceeded the EPA's guidelines for heavily polluted sediments at all stations from Conners Creek downstream to Gibraltar.

Degraded Benthos

This use is impaired in various locations in the river. The benthic community is degraded along the Michigan shoreline from the Rouge River to the Detroit River mouth. The communities were composed of pollution tolerant oligochaetes and chironomids. Near the Rouge River confluence, extremely high populations of oligochaetes indicate severe enrichment. Some locations in the Trenton Channel were devoid of benthic life, indicating toxicity. The lack of pollution intolerant organisms such as the burrowing mayfly in these areas also indicated degraded conditions. In addition, some sediments, sediment elutriate and sediment porewaters were toxic to benthic organisms in sediment bioassays. The most toxic sediments in these bioassays were located along the Michigan mainland shore of the Trenton Channel. Although sediment toxicity can be demonstrated for the Detroit River, field validation and direct cause linkages have not been established.

Degradation of Phytoplankton and Zooplankton

No impairment has been documented. The Detroit River RAP recommends further assessment of the nearshore zooplankton communities.

The phytoplankton community largely reflects the condition of the upper Great Lakes and Lake St. Clair. The community was judged as not impaired based on density, diversity and species composition.

The zooplankton community of the Detroit River was similar to that present in Lake St. Clair and composed of a normal balance of copepods, cladocerans and rotifers.

Loss of Fish and Wildlife Habitat

This use is impaired as a result of the significant physical loss of wetlands and habitat that occurred due to industrial growth and urban development.

The area has changed considerably over the last century due to industrialization and urban development. The majority of the extensive marshland along the Michigan and Ontario shores was filled and bulkheaded, eliminating the emergent plants and reducing the littoral zone. The result of this extensive urban development has been a major loss of fish and wildlife habitat. Dredging activities in the lower river have also resulted in habitat loss. Present development pressures continue to threaten fish and wildlife habitat.

Sediment toxicity tests have been conducted on Detroit River sediments; however, the precision and ability of these tests to predict field conditions have not been adequately studied. Although sediment toxicity can be demonstrated for the Detroit River and these patterns resemble contaminant distributions and resident benthos distributions, field validation and direct cause linkages have not been established.

Bird or Animal Deformities or Reproduction Problems

This use is not impaired. The Detroit River supports a fairly substantial and diverse population of fish-eating waterbirds including great blue herons, great egrets, ring-billed gulls, herring gulls, common terns and double crested cormorants. Significant reductions in environmental contaminants have occurred with corresponding improvements in colonial bird populations. The return of bald eagles to the northern shoreline of Lake Erie and the reappearance of bald eagle pairs in the lower Detroit River, further suggest that reproductive success of fish eating birds may be improving.

Degradation of Fish and Wildlife Populations

This beneficial use is not impaired.

Over sixty species of fish are presently found in the Detroit River with fish occupying all niches. The community is structured more towards bottom feeders than it was originally. The causes of the changes are due to several factors including invasion of new species, planting of new species, habitat changes and losses, losses due to dredging of the navigation channel in the lower river, and overfishing. Due to the changes in the fish community structure that have taken place over time, it has been suggested that some degradation of fish populations has occurred. However, a return to a historic fish community structure is not possible or realistic.

The wildlife carrying capacity of the Detroit River is much reduced from its precolonial condition. Industrial and urban development resulted in decreased populations, primarily through the loss of habitat. Improved or increased wetland habitat would result in enhanced wildlife populations and would have a positive impact on the health of the river.

Sport fishing is of high quality. The return per hour of fishing is good, and numerous economic, social and recreational benefits are provided by the current fish populations in the river.

4.0
POTENTIAL RELEASE PATHWAYS

4.1 SOIL/GROUNDWATER

Off-site migration of chemical constituents in groundwater at North Works is expected to be small or nonexistent due to the groundwater extraction system and the steel retaining wall along the Detroit River bank. Groundwater intercepted by these extraction wells is pumped to a carbon absorption system and then to the Wayne County POTW.

Well data collected by S.S. Papadopulos and Associates (March 1991) suggest that most groundwater at the facility flows towards three areas (Figure 4-1) labeled A, B, and C. The large hydraulic gradients are due to the numerous extraction wells in these three areas. Groundwater intercepted by these extraction wells and treated is discharged via the Wayne County sewer system. The natural discharge of groundwater and contaminants is reduced and possibly eliminated by the extraction well system and the steel retaining wall erected along 50% of the Detroit River bank.

Small quantities of contaminated groundwater may flow to the Detroit River along the portion of waterfront that does not have a steel retaining wall and the north boundary near Perry Place (SSP&A, 1984); although, this flow may have been eliminated by the installation of the groundwater extraction system.

4.2 SURFACE WATER

There are no streams or creeks which cross the facility or receive direct discharge from the facility. The two storage ponds (Polyols Pond and Fire-Water Pond) are lined with impervious materials and have elevated edges; as a result, the ponds do not receive surface water runoff. The Detroit River does not receive significant runoff through sources other than permitted outfalls because the facility has been graded to facilitate interior drainage into the outfall system. The surface water collection system is more efficient on the north half of the facility than on the undeveloped south half. Minor amounts of surface water are shed to the city sewer at the street.

5.0
POTENTIAL RECEPTORS

Human Population

Land use in the vicinity of the North Works facility is urban-residential. Based on the 1990 census, 30,938 people reside in the City of Wyandotte where the facility is located. Figure 5-1 shows the ownership of surrounding properties. Figure 5-2 shows that all the surrounding properties are used predominantly for commerce, by city government or as a cemetery. Marinas located both north and south of the North Works have a mixed commercial/recreational use.

Residential areas typically lie a block from the North Works; however, several new townhouses were built on Biddle Avenue across the street from the north end of the North Works.

Major uses of the Detroit River are as an industrial water supply, a drinking water supply and a transportation route. There are five municipal drinking water intakes in the Detroit River serving approximately 4.1 million people in nearly 100 communities. The only water intake located near the North Works is the City of Wyandotte intake near Point Hennepin (Figure 1-1). This intake is approximately 1000 ft south and 1700 ft east of BASF. Reportedly, the intake is below 25 ft of water. The water intake and service plant supply water to approximately 34,000 individuals. The plant has a capacity of approximately 18 MGD, and treats raw water using coagulation, flocculation, sedimentation, sand filtration, disinfection, and occasionally carbon feed for taste and odor control (DNR & OME 1991).

Fish Population

The fish population consists of natural and introduced species most of which are warmwater species. Introduced species include the common carp, rainbow smelt, alewives, sea lamprey and white perch. Approximately 60 natural species either reside, spawn or migrate into the river. Spawning occurs mainly in the lower river along the islands and the mainland shoreline (DNR & OME 1991).

Birds and Water Fowl

The river habitat is important to many resident and migratory birds. Several islands provide shore-bird habitat. Stony Island has a heron rookery and the southern portion of Grassy Island has a rookery for gulls and terns. The lower Detroit River encompasses the Wyandotte National Wildlife Refuge and is a gathering site for many migratory birds. According to Detroit Audobon Society surveys, 305 species of birds have been observed and approximately 150 species breed in the Detroit River area (Giffels et al. 1978).

Endangered Species

ERM (1991) reviewed the Michigan Natural Features Inventory database and found the following natural features in the vicinity of the facility.

Stophostyles helvula is a State special concern plant. It was last observed in 1914 in this area based on an ancient record concerning Grosse Ille. The species may still occur in nearby wet areas (i.e., ditches, wet meadows, sandy shores, etc.).

Obovaria subrotunda is a State threatened animal. It was last observed pre-1930 based on an ancient record concerning the Detroit River. This species still exists in nearby rivers.

The United States Department of Interior, Fish and Wildlife Service has determined that four federally listed and candidate species may be present near the North Works. The bald eagle *(Haliaeetus leucocephalus)*, a federally listed threatened species, may forage along the Detroit River, particularly during winter. The Northern riffleshell *(Epioblasma torulosa rangiana)*, a federally listed endangered species, may occur in the Detroit River. Recent occurrences of this species are recorded in the Belle Isle vicinity. No designated critical habitat is present in the vicinity of the North Works.

Federal candidate species likely to be in the vicinity are the common tern *(Sterna hirundo)* and the lake sturgeon *(Acipenser fulvescens)*. Candidate species are currently under review by the Service for consideration as endangered or threatened. Candidate species have no protection under the federal Endangered Species Act.

Environmental Summary

The results of ERM's 1991 environmental assessment for the facility indicated little impact on terrestrial or aquatic flora and fauna resulting from the compounds detected. Surface water concentrations are significantly lower than either EPA Ambient Water Quality Criteria or Michigan Water Quality Standards. Vegetation at the facility is sparse. There are no indications of endangered species at the facility.

6.0
SWMU A - FORMER 25,300 GALLON CONTAINER STORAGE AREA (INTERIM STATUS STORAGE PAD)

6.1 BACKGROUND

The chronology of events associated with the former 25,300 Gallon Capacity Container Storage Area are as follows:

- 5/78 concrete pad constructed.
- 11/80 Part A application.
- 3/87 discontinued use of area.
- 2/88 Part B called in by MDNR.
- 11/88 submitted closure plan to the MDNR
- 6/91 received closure from the MDNR.

The former 25,300 Gallon Capacity Container Storage Area (Figure 1-2) is the 75 ft by 75 ft southwest portion of a 100 ft by 178 ft concrete pad that was constructed in May 1978. The unit is located on the northwest portion of the facility north of the Chemical Engineering complex. The container storage area has a 3 ft square by 2-ft deep sump on its west side, and is enclosed on three sides by a 6 in high by 4 in wide curbing. The maximum theoretical number of drums that could be maintained in the subject area is approximately 460, 55-gallon containers. Approximately 240, 55-gallon containers is a more accurate reflection of the maximum number of containers since sufficient space was required for fork-lift access.

The unit was operational between May 1978 and March 1987 and was used as a storage pad for the central accumulation of hazardous waste containers (typically less than or equal to 55 gallon containers) prior to shipment off-site for treatment or disposal.

Wastes managed in the area have included those designated by Federal and State waste numbers presented in Table 6-1.

6.2 REGULATORY STATUS

The former 25,300 Gallon Capacity Container Storage Area was included on the original Part A application submitted to the EPA on November 18, 1980 pursuant to RCRA.

On February 26, 1988, BASF's Part B Application was called in by the Michigan Department of Natural Resources - Waste Management Division (MDNR-WMD) (see Appendix A, Exhibit 1). In response, BASF opted to pursue closure of the unit.

A closure document was submitted to the MDNR-WMD on November 8, 1988 for the subject area (see Appendix A, Exhibit 2). In summary, the closure document provided a written record for the MDNR-WMD that BASF will ensure the following conditions are met:

- All hazardous wastes have been removed from the subject storage area and have been disposed properly.
- The storage area will not be utilized for hazardous waste management activities in the future.
- The storage area does not constitute a current or future threat to public health, welfare, or the environment.

BASF discontinued the practice of placing waste containers in the storage area in the last quarter of 1986 and made arrangements to transport all hazardous waste containers stored in the area off-site to an appropriate facility. The last drum of hazardous waste was removed from the area on March 25, 1987.

As stated in the November 8, 1988, closure document, BASF does not believe that decontamination of the concrete pad at the subject area is necessary. Residual hazardous waste from spills or leaks are not present, and the concrete pad has a clean appearance as stated in a letter dated December 30, 1985 from Ms. Margaret Fields of the MDNR-WMD. In addition, the types of hazardous wastes stored on the pad during the period of active use were organic materials with relatively high vapor pressures.

An extensive sampling program in and around the storage area was not conducted to estimate background conditions and ascertain whether any contaminants were present. The basis for not implementing a sampling program was founded on the fact that chemical manufacturing operations have been conducted since the late 1890s, chemical contamination is present as shown in the 1981 MDNR site investigation, and the site had entered into a Consent Decree with the MDNR in 1986.

Based on the fact that the area was used for the storage of hazardous waste and because clean-closure is not possible for reasons mentioned above, the area is subject to 30 years of post-closure care and groundwater monitoring per 40 CFR 265.117. However, implementation of a 30-year post-closure program for the storage area that is concurrent to the 30-year remedial action program currently underway pursuant to the 1986 Consent Decree is redundant and not necessary. BASF believes that the requirements of the existing site remediation program are sufficient to satisfy the post-closure requirements. The terms of the 1986 Consent Decree were developed with rigorous input from various departments of the MDNR and the requirements of the document are identical (in some instances more stringent) to RCRA requirements for post-closure care and groundwater monitoring.

On June 27, 1991, the MDNR-WMD concurred with BASF on the closure document approach and recognized the status of the container storage area as closed. However, because of soil and groundwater chemical contamination identified in a June 1981 MDNR investigation, the MDNR denied granting clean closure (see Appendix A, Exhibit 3).

6.3 CURRENT CONDITIONS

Since closure of the unit, the concrete pad has been used for product and raw material storage associated with the Urethane Applications unit. The intended future use of the area is for non-waste management practices.

6.4 DISCUSSION OF EXISTING DATA

6.4.1 Geology

Subsurface materials in the area of SWMU A (former 25,300 gallon container storage area) are heterogeneous, generally consisting of fill overlying glacial sand, clay, and dolomite bedrock.

Specific properties of surficial materials present at the North Works Facility are discussed in Section 3.4.

6.4.2 Hydrogeology

Surface and groundwater flow is generally east toward the Detroit River. Well data collected by S.S. Papadopulos & Associates, Inc. suggests that most groundwater is intercepted near Vitamin Road, near the center of the facility. This may be due to the sump and numerous extraction wells located near this road. Groundwater discharged into the sump and extraction wells is drained to the Wayne County wastewater treatment plant via the city sewer system. The elevation of the water table is approximately 575 ft above mean sea level.

6.4.3 Sampling and Analysis

These are no records of releases from SWMU A. Sampling of soils and groundwater has not occurred near this unit.

6.4.4 Waste Characterization

Wastes once managed in this storage area are listed on Table 6-1.

6.5 NATURE AND EXTENT OF CONTAMINATION

There are no records of releases from SWMU A.

6.6 SUMMARY OF FINDINGS AND RECOMMENDATIONS

6.6.1 Summary of Findings

The former 25,300 Gallon Capacity Container Storage Area was constructed May 1978 and was included on the Part A permit application on November 1980. BASF received closure from the MDNR for this area during June 1991.

As stated in the November 8, 1988, closure document, BASF does not believe that decontamination of the concrete pad at the subject area is necessary.

A program to identify remaining hazardous waste or constituents was not instituted because chemical manufacturing operations have been conducted since the late 1800s at the facility, chemical contamination is present as determined in the 1981 MDNR site investigation, and the site had entered into a Consent Decree with the MDNR in 1986.

The area is being subjected to 30 years of post-closure care and groundwater monitoring per 40 CFR 265.117. However, implementation of a 30-year post-closure program for the storage area that is parallel to the 30 year remedial action program currently underway pursuant to the 1986 Consent Decree is not necessary. BASF believes that the existing groundwater extraction system is sufficient to satisfy the post-closure requirements (BASF, 1988).

On June 27, 1991, the MDNR-WMD concurred with BASF on the closure approach and recognized the status of the container storage area as closed but denied a determination of clean closure (see Appendix A, Exhibit 3).

6.6.2 Recommendations

This unit was closed during 1991. The closure document is presented in Appendix A, Exhibit 2. No further action is planned for this unit during the RFI.

7.0
SWMU B - R&D WASTE CRIB

7.1 BACKGROUND

The chronology of events associated with the 100 Cubic Yard Capacity Container Storage Area are as follows:

- concrete pad constructed prior to 1980.
- 11/80 Part A application.
- 2/88 Part B called in by MDNR.
- 10/88 request submitted to the MDNR to amend the Part A by deleting reference to the area.
- 5/90 ventilation system installed.

The nominal 100 Cubic Yard Capacity Container Storage Area (Figure 1-2) is a 6.5-ft by 26-ft concrete pad located on the west side of the Facility adjacent to a storage building near the Research and Development Complex. Past/present BASF practices utilized this area for accumulation of hazardous wastes for less than 90 days. Wastes typically consist of waste solvents from non-specific sources and ignitable wastes, generated exclusively from chemical research, engineering, and analytical activities. All hazardous waste accumulated in the area have been (and continue to be) transported off site within 90 days.

The maximum number of drums that could be maintained in the subject area is approximately 9, 55-gallon containers.

Wastes managed in the area have included those designated by Federal and State waste numbers presented in Table 7-1.

Weekly inspection logs are maintained for the area and provide for comments on the condition of containers, container labeling, housekeeping, containment pad integrity, chemical spills, and presence of rainwater. Examples are presented in Appendix B, Exhibit 1. A review of available weekly inspection records from December 1986 to present indicate that two spill incidents occurred involving in both cases the amines and solvents hazardous waste stream. The incidents occurred on July 6, 1990 and August 18, 1992. Both incidents results from overfilling of a container. In both cases the spillage was minimal and was cleaned up with absorbent material.

Interviews with existing and former BASF employees, for the period between approximately 1980 and 1986, indicate two spill incidents occurred. The first spill involved overfilling a drum with non-hazardous liquid polyol. The second spill involved placement of an incompatible substance (possibly isocyanate) into a drum. A chemical reaction forced relatively small amounts of some waste material out of the bung opening of the 55-gallon drum.

Prior to 1980 waste materials were collected in 5-gallon pails at the Waste Crib location on a concrete pad. During 1980, five waste streams were created based on chemical type and compatibility. Five, 55-gallon containers received the waste from the smaller laboratory satellite accumulation area containers. This practice is consistent with the practices conducted today.

In May 1990 improvements were made which included the installation of a ventilation system and concrete upgrades for access and curbing. In addition, an electronic key card entry was installed to improve security access.

7.2 REGULATORY STATUS

The 100 Cubic Yard Capacity Container Storage Area was included in the original Part A application submitted to the EPA on November 18, 1980 pursuant to RCRA as a "protective filing."

On February 26, 1988, BASF's Part B was called in by the Michigan Department of Natural Resources - Waste Management Division (MDNR-WMD). Upon review of the Part A, BASF determined that the 100 Cubic Yard Capacity Container Storage Area and a 4,000 gallon above ground storage tank should not have been included on the Part A application. In response, on October 11, 1988, BASF submitted a letter and affidavit statements to the MDNR-WMD requesting the removal of the 100 Cubic Yard Capacity Container Storage Area (see Appendix B, Exhibit 2) from the Part A.

Past/present BASF practices are to utilize the 100 cubic yard capacity container storage area for the accumulation of hazardous wastes, for less than 90 days. Wastes typically consist of waste solvents from non-specific sources and ignitable wastes generated exclusively from chemical research, engineering, and analytical activities. All hazardous waste accumulated in the area have been (and continue to be) transported offsite to a TSDF within 90 days.

7.3 CURRENT CONDITIONS

The unit continues to be managed as a less than 90 day hazardous waste accumulation area.

7.4 DISCUSSION OF EXISTING DATA

7.4.1 Geology

The distribution of subsurface materials in the area of the 100 cubic yard capacity container storage area is similar in content and thickness to that of the former 25,300 gallon container storage area. The strata are heterogeneous and are generally composed of industrial fill overlying fluvial sand, then lake clay and dolomite bedrock of the Dundee or Detroit River Group.

7.4.2 Hydrogeology

Surface and groundwater flow near the 100 cubic yard capacity container storage area is generally east toward the Detroit River. The direction of groundwater flow is influenced by the groundwater treatment extraction well system.

Most groundwater near the 100 cubic yard container is intercepted by extraction wells located in the center and northern parts of the Facility (areas B and C in Figure 4-1).

7.4.3 Sampling and Analysis

There are no records of releases from SWMU B. Sampling of soil and groundwater has not occurred near this unit.

7.4.4 Waste Characterization

Wastes managed in SWMU B are listed on Table 7-1.

7.5 NATURE AND EXTENT OF CONTAMINATION

There are no records of releases from SWMU B.

7.6 SUMMARY OF FINDINGS AND RECOMMENDATIONS

7.6.1 Findings

Past/present BASF practices are to utilize this area for the accumulation of hazardous wastes for less than 90 days. Wastes typically consist of waste solvents from non-specific sources and ignitable wastes generated exclusively from chemical research, engineering, and analytical activities. All hazardous waste accumulated in the area have been (and continue to be) transported off-site to a TSDF within 90 days.

Interviews with BASF employees and review of documentation indicate that there has not been any activity, such as a hazardous waste spill incident, that has or will create an adverse impact on human health or the environment.

7.6.2 Recommendations

This SWMU is operated as a waste accumulation area. Weekly inspections are conducted in accordance with RCRA. No releases have occurred from this SWMU, and no further actions are planned for this unit during the RFI.

8.0
SWMU C - CENTRAL WASTE ACCUMULATION STORAGE AREA (CWASA, BLDG. 53M)

8.1 BACKGROUND

The chronology of events associated with the former Central Waste Accumulation Storage Area (CWASA) are as follows:

- 8/83 began operation as a less than 90 day hazardous waste accumulation storage area.
- 6/92 discontinued waste activities at warehouse.
- 9/93 completed closure of warehouse storage area.

The former CWASA was located inside building 53M west of Chippewa Street (Figure 1-2). The former CWASA occupied approximately 2,000 square feet of floor space in an approximately 16,000 square foot building. The remainder of the building is used for general warehousing. The CWASA was used from August 1, 1983, until June 22, 1992, for the accumulation of non-hazardous wastes and the accumulation of hazardous wastes for less than 90-day periods. The CWASA was 23-ft by 87-ft with a maximum capacity of 450 55-gallon containers. The CWASA was divided into nine bays by poured concrete partitions. Prior to the initiation of the waste accumulation activities, the existing floor of the CWASA was scarified and mortared with low permeability grout and subsequently sealed with a chemically resistant coating (Techna, 1993).

Wastes accumulated in the CWASA included a variety of materials generated from industrial processes, laboratory activities, research and development activities, and incidental spill clean-ups. Wastes managed in the area have included those designated by Federal and State waste numbers presented in Table 8-1.

8.2 REGULATORY STATUS

The former CWASA was managed as a less than 90-day hazardous waste accumulation storage area. The CWASA was used for the accumulation of containers prior to transportation off-site.

A report was prepared September 16, 1993 to document clean closure of the CWASA in accordance with 40 CFR 265.111 and 265.114 as required by 40 CFR 262.34 and Rule 299.9306 of Michigan Act 64 of 1979 (Appendix C, Exhibit 1). Closure activities consisted of an extensive surface cleaning of the CWASA and surrounding areas followed by three separate water rinses. This was followed by sampling and analyses designed to verify that the CWASA was successfully decontaminated and to assess if waste management practices during the operation of the CWASA had impacted the accumulation area (Techna, 1993).

Photographs of the bays were taken after completion of the closure activities and during recent construction activities (Appendix C, Exhibit 2).

8.3 CURRENT CONDITIONS

The current and future use of the area once occupied by the CWASA is for general warehousing and non-waste management activities. Recent construction activities in the area include the removal of bay partitions and bringing the bay elevations to current floor level with concrete. The purpose of the construction activities is to improve the area for full utilization of space for general warehousing.

8.4 DISCUSSION OF EXISTING DATA

8.4.1 Geology

Surficial materials near SWMU C (central waste accumulation storage area) are similar to SWMUs A and B. These materials are heterogeneous in content and transmissivity but generally consist of industrial fill overlying lake sand, clay, and dolomites bedrock of the Dundee or Detroit River Group.

8.4.2 Hydrogeology

Groundwater flow near the central waste accumulation storage area is generally toward the Detroit River. Groundwater flow is affected by surface infiltration through heterogeneous materials and by the groundwater treatment extraction wells at the Facility. The close proximity of SWMU C to extraction wells located near the center of the Facility (area B on Figure 4-1) suggests that most groundwater near SWMU C flows toward these wells.

8.4.3 Sampling and Analysis

Wash water generated during closure of this unit was analyzed for volatile organics, semi-volatile organics, PCBs, cyanide, silver, cadmium, chromium, and selenium. These chemicals are consistent with wastes once stored here. Action levels were not exceeded for any analyte. The closure report (Appendix C, Exhibit 1) describes the sampling and analyses.

8.4.4 Waste Characterization

Waste once managed in this unit are listed on Table 8-1.

8.5 NATURE AND EXTENT OF CONTAMINATION

There are no records of releases from SWMU C.

8.6 SUMMARY OF FINDINGS AND RECOMMENDATIONS

8.6.1 Findings

The closure report dated September 16, 1993 documents clean closure of the CWASA (Appendix C, Exhibit 1). Closure activities consisted of surface cleaning of the CWASA and surrounding areas followed by three separate water rinses. This was followed by sampling and analyses designed to verify that the CWASA was successfully decontaminated and to assess if waste management practices during the operation of the CWASA had impacted the accumulation area (Techna, 1993).

8.6.2 Recommendations

This unit was closed clean during 1993. The closure report is presented in Appendix C, Exhibit 1. Waste storage no longer occurs here. No releases have occurred from this SWMU, and no further action is planned during the RFI.

9.0
SWMU D - 4,000 GALLON TANK

9.1 BACKGROUND

This unit is a glass lined pressure vessel rated at 25 psi and full vacuum at a design temperature of 400°F. It is installed in a diked enclosure (Figure 1-2) together with an acetic anhydride tank. The dike capacity is 1.5-times the volume of the largest tank (Figure 9-1 and 9-2). Both tanks were installed in 1970s when the Vitamin E Plant was constructed. There has never been known leaks from either tank in the dike and both units are included in the Vitamin Plant's Preventative Maintenance Program.

This tank was originally used to store recyclable, by-product acetic acid from the Vitamin E manufacturing process. This material was normally sold for repurification. On a few occasions, this tank was used to store material which could not be sold and was consigned for disposal as waste. Because of these few occurrences, in 1980, this tank was included in the Part A application to the MDNR.

In 1987, the use of this tank for handling acetic acid was discontinued in favor of a process change which fed the process stream directly to a neutralization tank which is part of a waste treatment unit. The discharge of this unit goes directly to the Wayne County POTW. The 4,000 Gal tank was later converted to use as a storage tank for heptane, a raw material in the Vitamin E process.

9.2 REGULATORY STATUS

The 4,000 gal storage tank was included on the original Part A application submitted to the EPA in November, 1980 pursuant to RCRA as a "protective filing". In December 1988, after consultation with the MDNR, BASF requested amendment to the Part A by deleting reference to this tank. MDNR expressed agreement, but this action was not completed. Recent contact with MDNR has reactivated this process, and BASF has verbal agreement from MDNR that upon receipt of all completed documentation, the tank will be taken off the Part A. Detailed drawings of the 4,000 gallon tank are included (Figures 9-1 and 9-2).

9.3 CURRENT CONDITIONS

The tank is used currently for heptane storage (a raw material).

9.4 DISCUSSION OF EXISTING DATA

This tank formerly handled waste acetic acid with traces of acetic anhydride, heptane, and Vitamin E oils. No other data are available.

9.4.1 Geology

Subsurface materials near SWMU D (4,000 gallon tank) are similar to the materials encountered near SWMUs A, B, and C, composed generally of heterogenous fill overlying peat, fluvial sand, lake clay, then dolomite.

Immediately under the fill near SWMU D is 3 ft of peat. A layer of fluvial sand is present above the lake clay and beneath the peaty layer.

9.4.2 Hydrogeology

Groundwater flow near SWMU D is generally toward the Detroit River. The direction of groundwater flow is influenced by heterogenous transmissivity of surficial materials, infiltration of runoff, and the groundwater treatment extraction wells at the Facility. The hydraulic gradients created by these extraction wells suggest that most groundwater near

SWMU D flows toward extraction wells at locations B and C (Figure 4-1) in the center and northern parts of the Facility.

9.5 NATURE AND EXTENT OF CONTAMINATION

No releases from the SWMU have been documented, and there is no visible evidence of any release.

9.6 SUMMARY AND RECOMMENDATIONS

This tank is a competent pressure vessel located within a diked containment. There are no known spills or releases from this vessel. No further action is planned during the RFI.

10.0
SWMU E - 2 MILLION GAL PER DAY IMPOUNDMENT

10.1 BACKGROUND

SWMU E, referred to as the Polyols Pond, was built in 1975. Its location is shown on Figure 1-2. Its construction consisted of earthen dikes lined with clay and a concrete wall separating the pond into two sections. The bottom liner for the pond was constructed by compacting two 1-ft thick layers of clay. Generally, the pond receives wastewaters from two source classifications, those related to OCPSF production from the Polyols Plant and those not related to OCPSF production activity.

Approximately 35% of the wastewater from the Polyols Plant comes from OCPSF production. The wastewater originates from vacuum jet condensate, equipment and floor wash water, deionizer backflush, production and backflush spillage as well as stormwater from the plant roof, parking lot, tank farm dike and the rail car area. A portion of the stormwater is treated with granular activated carbon prior to introduction to the pond. Figure 10-1 illustrates the Polyol Plant wastewater segregation system.

The non-OCPSF contributors are the EPO Plant, the Steam Facility and noncontact cooling waters from several equipment sources. Table 10-1 lists the sources of wastewater that flow to the Polyols Pond before discharge to the Detroit River via Outfall 001. The table is based on the best information available. The data are scheduled for review and updating by May 1995. Revisions will be provided in the RFI report, if relevant.

Prior to discharge the wastewater is neutralized as necessary with sulfuric acid and discharged into the pond. The wastewater is then combined in a weir box with additional noncontact cooling water and stormwater runoff. The wastewater is then discharged through a diffuser pipe to the Detroit River. A detailed site plan of the Polyols Pond is shown in Figure 10-2.

10.2 REGULATORY STATUS

The discharge from this SWMU is regulated under NPDES permit number MI0000540 that has report-only requirements for flow, temperature, total cadmium, total lead, total mercury, trichloroethylene, OCPSF pollutants other than toluene and outfall observation. The discharge limitations for this outfall include total suspended solids (TSS), 5-day biochemical oxygen demand (BOD5), total organic carbon (TOC), toluene and pH (Appendix F, Exhibit 1).

10.3 CURRENT STATUS

The Polyols Pond operates as the treatment area for wastewaters described above prior to discharge to the Detroit River. It also serves as a catch basin for most spills that may occur at the Polyols Plant. Prior to 1980, spills including ethylene oxide, propylene oxide, acrylonitrile, styrene, toluene, hexane and toluenediamine occurred (see section 2.4). Since 1980 the number of spills has decreased. Routinely, raw materials and products have also been deposited at the Polyols Pond. These materials are summarized in Table 10-2. Other materials currently used at the Polyols Plant are summarized in Table 10-3

Sediments accumulate on the pond bottom that, from time to time, require disposal at an offsite permitted facility. The sediment is first tested to assess hazardous characteristics. This information is then used to fill out the disposal facility's Generator Waste Characterization Profile Report (Appendix H, Exhibits 1 and 2).

10.4 DISCUSSION OF EXISTING DATA

10.4.1 Geology

Subsurface materials near SWMU E are heterogenous and consist of industrial fill overlying peat or organic clay, fluvial sand, lake clay, and dolomite bedrock.

Surface materials at former observation well P-28-N (Figure 2-27) located within 80 feet of the impoundment, consist of approximately 8 ft of fill. Immediately under this fill is 2 to 3 ft of sand overlying 2 ft of peat or organic clay. Under this peat at a depth of about 11 ft is a layer of clay 3 to 4 ft thick. A layer of sand approximately 5 ft thick underlies the clay. More clay is directly beneath the sand. These surficial materials may be similar to the materials immediately below the impoundment.

10.4.2 Hydrogeology

All surface water contained in SWMU E is discharged through Outfall 001 directly to the Detroit River.

Groundwater near the impoundment generally flows east to the Detroit River or north toward Perry Place. This conclusion was stated in a report (SSP&A 1984) which pre-dates installation of the groundwater extraction system. Small quantities of groundwater may be intercepted by extraction wells E14NC and E15NC located in the northern part of the Facility (Figure 2-27).

BASF plans to extend the steel sea-wall into the area between the Polyol Pond and the Detroit River. The sea-wall may divert more groundwater away from the river.

10.4.3 Sampling and Analysis

Wastestream characterization of sediments from the Polyols Pond occurs when sediments are to be disposed. A wastestream characterization profile typically is required by the disposal facility to be updated annually, however, only if the wastestream is disposed of throughout the year. If disposal occurs at a frequency less than once per year, such as once every two years, a wastestream characterization profile is required each time the sediments are disposed (Appendix H, Exhibits 1 and 2).

Wastewater from the Polyol Ponds is discharged through Outfall 001 which is sampled and analyzed according to the NPDES permit.

10.4.4 Waste Characterization

Waste characterization results for the sediments from the Polyol Ponds indicate decreased contamination since 1980. Appendix H, Exhibit 1 indicates some contamination of the sediments; however, more recent characterization profiles indicate contamination below detectable limits (Appendix H, Exhibit 2).

Analyses for waste characterization was limited to the hazardous waste characteristics. The sediments did not display any of the characteristics of a hazardous waste.

10.5 NATURE AND EXTENT OF CONTAMINATION

There are no records of releases from SWMU E. The discharge limits for some parameters have been exceeded on occasion. The exceedances are listed in Appendix F, Exhibit 2.

Since the Polyols Pond is clay lined, uncontrolled migration of contaminants from the pond is unlikely. Contaminants are found primarily in the pond sediments with trace contaminant migration toward Outfall 001.

10.6 SUMMARY AND RECOMMENDATIONS

The last time sediments from this pond were sampled, chemical constituents were not detected at concentrations requiring the sediments to be classified as hazardous. Analyses of the sediments included RCRA characteristic testing for ignitability, corrosivity, reactivity and toxicity. Discharge from the pond is regulated under the NPDES permit. Routine sampling and analyses are performed at the required frequency for the contaminants listed for Outfall 001 in the NPDES Permit. Disposal of sediments will continue in compliance with current waste regulations.

Sediment samples from the pond will be collected the next time the pond is to be cleaned (possibly during 1995 or 1996). Samples will be analyzed for hazardous waste characteristics. Results will be presented in the RFI report.

Several groundwater monitoring wells and piezometers are proposed at locations that surround this pond. If groundwater gradients indicate that the pond may be leaking, samples of groundwater will be collected and analyzed for parameters listed in 40 CFR 264 Appendix IX.

11.0
SWMU F - WASTE FILTER CAKE AREA

11.1 BACKGROUND

From 1957 to 1979, this SWMU (Figure 1-2) was used as an above grade disposal area for spent Britesorb®, a magnesium silicate filter aid used to filter polyols. Britesorb® is nonhazardous. Polyols also are nonhazardous and may be combustible only under certain conditions, however, when polyol is absorbed onto the highly active surface of the Britesorb® the combination can combust spontaneously. Much like oily rags, the combination is hazardous by reason of the physical properties of the combination, not because of chemical makeup.

Deposits of spent filter cake were interbedded with soda ash, sodium bicarbonate, lime wastes, and clinker and ash from the North Works Boilerhouse. These secondary inorganic materials are not classified as hazardous waste. Filter paper and filter cartridges from other polyol filtering applications also were buried in SWMU F. Used glassware and sample bottles from research activities reportedly were buried at this site, but no fragments have been uncovered during excavation nor have supportive records been found. It was estimated in 1979 that approximately 60,000 cu yds of fill were deposited in this area to an approximate height of 8-ft above original grade. The topography of the filter cake waste pile is shown in Figure 11-1.

In 1979, waste pile operations ceased on site, and the Britesorb® was disposed of off site as a spontaneously combustible material.

11.2 REGULATORY STATUS

Land disposal operations were discontinued in 1979. The area has no regulatory status. Filter cake wastes are shipped to Envotech Management Services, Inc. of Belleville, Michigan (MID000724831), a permitted hazardous waste treatment and disposal facility.

11.3 CURRENT STATUS

The above ground disposal area is inactive although some ground surface contouring has been done for drainage control, and some topsoil was added to promote vegetation growth.

11.4 DISCUSSION OF EXISTING DATA

11.4.1 Geology

Subsurface materials at SWMU F are similar to other SWMUs (see Section 3.0). These materials consist of industrial fill ranging from 8 to 22 ft in thickness, overlying lacustrine sand, clay, and dolomite bedrock (Dundee or Detroit River Group). The fill in this area (filter cake and DBO) has a low permeability and propensity to hydrate chemically.

11.4.2 Hydrogeology

Groundwater flow is influenced by surface infiltration, heterogenous transmissivities of surficial material, steel retaining wall along the Detroit River, and the groundwater extraction wells near the center of the Facility (Figure 2-27).

The presence of hydraulic gradients created by the extraction wells in the center of the Facility (Figure 4-1) suggests that most groundwater near SWMU F is intercepted by these extraction wells.

11.4.3 Sampling and Analysis

Sampling and analyses of the waste filter cake occurs on at least an annual schedule. Analyses are for waste characterization prior to shipment off site.

During excavating in 1990, waste filter cake was uncovered, sampled, and analyzed.

11.4.4 Waste Characterization

The primary constituents of the waste filter cake are magnesium silicate saturated with polyol. Results of analyses performed on the waste filter cake uncovered in 1990 are presented in Appendix D, Exhibit 1. Based on these results, the filter cake does not exhibit the characteristics of a hazardous waste. These characterizations also describe the materials landfilled prior to 1979.

11.5 NATURE AND EXTENT OF CONTAMINATION

The hazardous fill material, spent Britesorb® filter cake is hazardous only because of its physical condition at the time of burial. In situ, it is deprived of air and wetted by moisture in the ground and cannot burn. Long term exposure to burial conditions has likely saturated the particle surface to the point were the material no longer can combust spontaneously.

There are no hazardous constituents of the filter cake. The only hazardous exposure involves direct access to the combustible material at its point of burial. Migration is not a potential method of spreading this hazardous substance.

11.6 SUMMARY AND RECOMMENDATIONS

The hazard associated with this above ground disposal area is associated only with direct exposure to material in a state where it can combust spontaneously. It does not display a toxic characteristic. The filter cake may have lost its spontaneously combustible characteristic due to prolonged burial.

The extent of waste filter cake will be defined by obtaining samples to a depth of 10 to 15 ft. These depths are selected because total relief at this SWMU is approximately 10 ft and filter cake was not buried. Samples will be obtained on a grid of suitable scale. Samples will be examined for visible evidence of filter cake. Samples of the waste filter cake will be collected and tested for RCRA hazardous waste characteristics and in accordance with methods for self-heating materials published at 49 CFR 173, Appendix E.

12.0 SWMU G - TWO NOMINAL RUBBLE STAGING AREAS

12.1 BACKGROUND

The entire area ascribed to these two units has been built up by industrial fill over the period from 1890 to 1980. The location is shown in Figure 1-2. The EPA's reference in the Consent Order to an early 1980s report categorizing these sites as disposal sites for rubble seems to reference a time when the area was used as a staging area for demolition of the Soda Ash Complex (See Site general history). Concrete, steel and other debris was piled in this area prior to removal from the North Works. Some soda ash, lime fines and cinders may have been present as residual material in hoppers or bins, but these materials are not hazardous waste. The ground surface elevation before and after the period referenced did not change appreciably. Some rubble such as bricks, concrete and reinforcing steel can be found in the top layer of soil in the area.

12.2 REGULATORY STATUS

This area was never considered a landfill and has no regulatory status.

12.3 CURRENT STATUS

The area is not used and has had some surface grading in the past 10 years to establish drainage contours. Top soil has been added to facilitate vegetative growth.

12.4 DISCUSSION OF EXISTING DATA

12.4.1 Geology

Subsurface materials in the area of SWMU G are heterogeneous, generally consisting of fill overlying glacial sand, clay and dolomite bedrock. Specific properties of surficial materials present at the North Works Facility are discussed in Section 3.4.

12.4.2 Hydrogeology

Surface and groundwater flow is generally east toward the Detroit River. The direction of groundwater flow is influenced by the four groundwater extraction wells located near this SWMU.

Most groundwater near the two rubble staging areas is intercepted by extraction wells located in the southern part of the Facility (area A in Figure 4-1).

12.4.3 Sampling and Analysis

Sampling and analyses have not been performed to characterize this SWMU.

12.4.4 Waste Characterization

The demolition materials formerly staged in this SWMU were, by observation, nonhazardous building rubble. The materials were removed and only residual materials could be present.

12.5 NATURE AND EXTENT OF CONTAMINATION

This SWMU likely contains no hazardous waste or constituents from the building rubble. General site fill as described in Section 3.4 likely remains in this area.

12.6 SUMMARY AND RECOMMENDATIONS

This area was used to accumulate debris prior to transport off-site. SWMU G was not a landfill. There is no evidence of significant changes in elevation during the early 1980s resulting from activities of that period. The demolition rubble staged in the area for off-site disposal was nonhazardous.

Aerial photographs (if available) and site drawings will be examined to identify the size of this area and to plan the sampling tasks. Procedures are presented in the QAPP.

The surface soils in this area will be sampled to a depth of approximately 6 to 12 in. and analyzed by TCLP to confirm the nature of the deposits and to assess if hazardous constituents are present.

13.0
SWMU H EMERGENCY CONTAINMENT POND (HISTORICAL ROUTING OF OUTFALL 003)

13.1 BACKGROUND

SWMU H, initially identified as an Emergency Containment Pond (Figure 1-2), was actually a retention pond in the historic routing of a drainage system to what is now Outfall 003. Figure 13-1 shows this routing. The Containment Pond could be closed to prevent spills from reaching the outfall. Several other retaining ponds in the system had the same capability.

The origin of the system traces to the late 1800s and the dewatering and filling of the original marshland. At that time, a small ditch ran through the facility. Records indicate that by the late 1940s or early 1950s, the ditch system had assumed the configuration shown in Figure 11-1. Parts of this system were in use much earlier. Originally, portions of the system were used as drains for the pre-1920s Soda Ash complex on the west side of the North Works. Fragmental records indicate that there was originally only one drainage system for that complex so the system would have handled stormwater, noncontact cooling waters, contact waste waters and sanitary drainage as a combined stream. By the time the ditch system had reached the final configuration designated as SWMU H, the primary effluents were stormwater, noncontact cooling water from the main office and research building, and contact wastewater from the Pilot Plant and later from the Chemical Engineering Building. Additionally, some drainage from processing areas within the Soda Ash Complex entered the system in the eastern half of the system (Figure 11-1). No portion of the system was lined. It was periodically dredged to maintain flow.

The containment pond was equipped with valves in the entrance and discharge pipes to isolate spills into the system from the Pilot Plant. Portions of the ditch system actually were drainage pipes to facilitate roadways over the ditches and for flow control purposes. Over the years, the Pilot Plant manufactured or handled a wide variety of materials including polyols, urethane latex, isocyanates, amines, magnesium silicate, methanol, methylene chloride, isopropyl alcohol, and Basalin (a herbicide). There is no record of the number of times this containment was employed to contain spills, although a Basalin spill is known to have occurred in the immediate area. No records have been found detailing the use of any of the containment features (primarily weirs) in the downstream impoundments to isolate problems from any of the sources; however, it is generally acknowledged that such isolations did occur. The entire open drainage system was operated under the facility's NPDES permit when such permitting came into existence.

Beginning in the early 1980s, this ditch system was gradually filled in and replaced with a steel piping system with welded joints to prevent infiltration of groundwaters into the Outfall 003 discharge.

13.2 REGULATORY STATUS

This SWMU has no recognized regulatory status. The closed pipe drainage system that replaced it is operated under a NPDES permit.

13.3 CURRENT CONDITIONS

The area occupied by this SWMU is used only as the corridor for the hardpiped 003 Outfall drainage system. The filled ditches have been seeded to grass.

13.4 DISCUSSION OF EXISTING DATA

A portion of this SWMU is also overlapped by the PDC spill area (AOC 5). See that section for sampling performed in the overlapped areas. No independent sampling or analysis has been performed in SWMU H. No waste characterization data are available.

13.4.1 Geology

Surficial materials near SWMU H are similar to SWMUs C and F. These materials are heterogeneous in content and transmissivity but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific properties of surficial materials present at the North Works Facility are discussed in Section 3.4.

13.4.2 Hydrogeology

Groundwater flow near the emergency containment pond would naturally be toward the Detroit River. Groundwater flow is affected by surface infiltration, heterogeneous materials and by the nine groundwater extraction wells in the center of the facility. Most groundwater near SWMU H flows toward the extraction wells located near the center of the facility (Area B on Figure 4-1).

13.5 NATURE AND EXTENT OF CONTAMINATION

This filled water course would be expected to exhibit some degree of contamination due to its historical use. The nature and extent of residual contamination are unknown.

13.6 SUMMARY AND RECOMMENDATIONS

SWMU H is a filled ditch system that historically was used as the drainage system to Outfall 003. The Emergency Containment Pond near the Pilot Plant was one of three retaining ponds within the system. All three had the potential for isolating upstream chemical spills from the river. The ditch system handled both contact and noncontact waters from a variety of sources over its life. Some degree of contamination is probable. The area is currently backfilled and vegetated.

SWMU H is overlapped by AOC 5. This area contains a different source of contamination than that expected from the history of SWMU H.

Borings will be advanced through the fill until the former bottoms of the ditch and pond are reached. At that position, a soil sample will be obtained for analyses of compounds listed at 40 CFR 264 Appendix IX and Basalin.

Five groundwater monitoring wells are proposed in this area (see QAPP Sections 1.5.1 and 1.5.9) and nine extraction wells currently are operating. A groundwater investigation will be performed on a site-wide basis.

The potential for this SWMU to have impacted sediments in the Detroit River will be investigated during the tasks to evaluate sediments described in the QAPP.

14.0
AOC 1 - AREA SOUTH OF POLYOLS PLANT

14.1 BACKGROUND

AOC 1 is located south of the Polyols Plant, as presented in Figure 1-2. The sources of hazardous constituents present in AOC 1 include styrene from the Polyols Plant (AOC 8), benzene, toluene, ethylbenzene, and xylenes (BTEX) from the former Coke and By-products Plant (AOC 2) and the associated North Tar Pit (AOC 4). Hazardous constituents identified in this area are listed on Table 14-1. AOC 1 is roughly described as the area being evaluated as part of the Toluene Remediation Investigation Project which was started March 1992.

In early 1990, three toluene limit exceedances at Outfall 001 were caused by contaminated stormwater run-off. Investigation identified the source of the toluene in the shallow soils around the Polyols Plant. To alleviate this problem temporarily, the stormwater system was modified to segregate and treat, by carbon adsorption, the contaminated stormwater. The MDNR expressed concern regarding the adequacy of the current system in 1992.

Recent grading in this area has reduced the volume of non-contaminated water that was being put through the carbon treatment system. The reduction in the amount of water brings the volume requiring treatment in line with the capacity of the system.

14.2 TOLUENE REMEDIATION INVESTIGATION PROJECT

The Toluene Remediation Investigation Project (TRIP) includes two primary elements: investigation and remedial recommendations.

The purpose of the TRIP is to determine the nature, extent, direction, rate, movement and concentration of toluene and styrene in the subsurface area around the Polyols Plant and conduct necessary tests or studies to determine the feasibility of remedial technologies.

The subsurface investigation includes the following tasks: 1) sampling of soil in soil borings, water sampling, 2) engineering properties samples, 3) monitoring well installation, 4) monitoring well sampling and groundwater analysis, 5) hydrogeologic study, and 6) data compilation and investigative report.

The remedial design will include the following: 1) assessment of the effectiveness of potential remedies; 2) evaluation of performance, reliability, ease of implementation and potential impacts of the recommended remedy; 3) assessment of the time and cost; and 4) assessment of regulatory requirements.

The conceptual remedial system designs will focus primarily on bioremediation. Two technologies that have been eliminated for consideration are soil vapor extraction and air sparging.

In March, 1992, the Toluene Remediation Project was initiated to conduct studies and gather information necessary to define the scope of and provide a design basis for in-situ remediation of toluene contamination in shallow soils around the Polyols Plant. Groundwater Technology, Inc. (GTI) was selected as the contractor for the project, which included an investigation phase and a remedial design.

Activities completed to date for the investigation phase include completion of 18 soil borings, installation of five monitoring wells and one purge well and two rounds of monitoring well sampling. In October, 1993 BASF authorized GTI to proceed with a groundwater dye tracer study in lieu of an aquifer pump test to define the hydrogeologic parameters of the aquifer. The decision to pursue a tracer test was based on the high cost of treating the groundwater generated from the pump test which would be necessary to meet POTW pollutant discharge limitations. A Groundwater Discharge Permit Exemption from Michigan DNR is necessary in order to conduct the tracer study. A draft report containing the information needed to obtain the Permit Exemption from the MDNR was prepared by GTI and submitted to BASF in December 1993. After review by BASF, the permit exemption report was finalized and submitted to the DNR in February 1995.

For the remedial design, a bioremediation feasibility study has been completed. Initial test results of three systems which were evaluated showed that a dentrifying system was most effective. It was determined that air sparging/soil venting is not a feasible remedial alternative due to the high water table.

Tasks remaining are completion of the tracer study, tracer study report, subsurface investigation report (85% complete) and conceptual remediation system design (25% complete). The TRIP is expected to be completed within 8 months.

14.3 REGULATORY STATUS

This AOC has no regulatory status.

14.4 DISCUSSION OF EXISTING DATA

14.4.1 Geology

Surficial materials near AOC 1 (area south of Polyol Plant) are mostly gravels. These materials are heterogeneous containing coals, silts, wood, ash, and bricks. Typical thickness is approximately 10 ft. The industrial fill overlies 5 to 15 ft of lake sand and clay. Specific properties of surficial materials at the North Works Facility are discussed in Section 3.4.

14.4.2 Hydrogeology

Groundwater flow near AOC 1 was naturally toward the Detroit River. Groundwater flow is affected by surface infiltration and by the two groundwater extraction wells in this part of the Facility. Most groundwater near AOC 1 is intercepted by the extraction wells (area C on Figure 4-1).

14.5 NATURE AND EXTENT OF CONTAMINATION

Sampling and analyses of soils and groundwater was performed by the MDNR in 1981 and by ERM (1991). In general, contamination in soils is within the area outlined for AOC 1 on Figure 1-2. Chemical constituents are primarily volatile organics. ERM (1991) reported elevated levels of benzene, ethyl benzene, toluene, styrene, and vinyl chloride.

GTI reported the presence of BTEX, styrene and vinyl chloride in soil. GTI did not detect vinyl chloride in groundwater samples, but the other five compounds were present.

14.6 RECOMMENDATIONS

This area is the site of the ongoing TRIP. This interim measure is in progress and additional work during the RFI is not recommended. Conclusions from the TRIP will be incorporated into the RFI Report.

15.0
AOC 2 - OLD COKE PLANT

15.1 BACKGROUND

For many years, a set of Coke Ovens and a By-Products Plant were operated in the North Works (Figure 1-2); the general history of the North Works presents details (see Section 2.2 of this report). The entire area occupied by this plant is known to be contaminated with organics such as toluene, naphthalene, phenols, and other compounds typical of coking (see Table 15-1). The 1986 MDNR Consent Decree intended to address this area.

A Toluene Remediation Investigation is in progress adjacent to this area. A surface drainage control program utilizes controlled collection, carbon treatment of certain waters and welded joint drainage pipe to control groundwater infiltration.

15.2 REGULATORY STATUS

This area has no regulatory status.

15.3 CURRENT CONDITIONS

This area is under active use as part of the North Works. It is operated under the control measures stated above to prevent contamination from reaching the Detroit River either through drainage to outfalls or migration in groundwater.

15.4 DISCUSSION OF EXISTING DATA

15.4.1 Geology

Surficial materials near AOC 2 (old coke plant) are similar to AOC 1. These materials are heterogeneous but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific properties of surficial materials at North Works are discussed in Section 3.4.

15.4.2 Hydrogeology

Groundwater flow near the old coke plant naturally was toward the Detroit River. Groundwater flow is affected by surface infiltration through heterogeneous materials and by the two groundwater extraction wells in this area of the Facility. Most groundwater near AOC 2 now flows toward extraction wells located in the northern part of the Facility (Figure 4-1).

15.4.3 Sampling and Analysis

Sampling conducted by the MDNR near the former Coke Plant detected PNAs, volatiles and metals primarily.

15.4.4 Waste Characterization

Waste materials across the area of AOC-2 may be generalized as organic extractables from coal during the coking process. Chemical constituents from Kopper's-type Coke Plants include BTEX, PNAs, phenolics, ammonia, cyanide, and a variety of metals (Table 15-1).

15.5 NATURE AND EXTENT OF CONTAMINATION

This AOC contains detectable concentrations of organic(s) solvents in soils and groundwater. While recent efforts have been made to prevent migration of this contamination through the control of drainage and groundwater flow, the entire area within AOC-2 is considered to be contaminated to some degree.

15.6 SUMMARY AND RECOMMENDATIONS

Evaluation of corrective measures for this AOC will be on an area-wide basis. Emphasis will be placed on evaluating the groundwater control system currently in place or under development and on improving the system to maintain inward groundwater gradients. Proposed monitoring wells and soil sampling locations are positioned between AOC 2 and the Detroit River. Sampling plans are presented in the QAPP and are intended to identify if contaminants that could be associated with the former plant are migrating. Analyses will be limited to the constituents listed on Table 15-1.

16.0 AOC 3 - SE OF WYANDOTTE ROAD AND OTTAWA ROAD (CARBOSE SKIMMER PIT)

16.1 BACKGROUND

The chronology of events associated with the area southeast of Wyandotte Road and Ottawa Road are as follows:

- 5/92 initial soil excavation as part of a sewer line repair.
- 9/93 and 10/93 complete soil excavation.

AOC-3 is also called the former Carbose Skimmer Pit (Figure 1-2) and was designed as a wastewater flow-through process tank associated with carbose manufacturing. The approximate dimensions of the Carbose Skimmer Pit are 14.5-ft by 41.5 ft by 10.75-ft high. For additional details see Figures 2-20 and 16-1. The Carbose Skimmer Pit was used originally for treatment of wastewater (i.e., oil separation, sedimentation, neutralization) associated with carbose manufacturing at the Kreelon Plant, circa 1948.

In May 1992 soil was excavated in the vicinity of the former Carbose Skimmer Pit to repair a collapsed stormwater sewer manhole. As part of the manhole repair, which was necessary to prevent plugging of the sewer line, the northeast corner of the former pit was excavated for access to the manhole. The portion of excavation within the pit revealed soil, debris (including fire bricks), and a black tarry substance. These materials were sampled and placed in roll-off boxes pending waste characterization. The excavation was backfilled with clean sand.

In October 1992, contaminated soil and debris removed from the Carbose Skimmer Pit was sent off-site to Michigan Disposal, Inc., Belleville, MI (EPA ID No. MID 000 724 831) for stabilization and landfilling. Three shipments totaling 62 cubic yards of soil and debris were sent off-site bearing the EPA hazardous waste codes D018, D040, and D043.

In 1993, BASF removed the remaining materials from the Pit. In August and September 1993, 174 cubic yards of contaminated soil and debris and 1500 gallons of water were removed from the Carbose Skimmer Pit for shipment to Michigan Disposal, Inc., Belleville, Michigan. The contents, including soil, debris, and water, were removed leaving the concrete structure of the carbose skimmer Pit intact.

The nature of the black tarry substance and the fire bricks indicated the material may have originated from the former Coke Plant. The hazardous wastes or hazardous waste constituents identified at AOC 3 are presented in Table 16-1. For a complete analytical report on the contents of the Carbose Skimmer Pit, see Appendix I, Exhibit 1.

As stated previously, the contents of the Pit (i.e., soil, debris, and water) were removed leaving the concrete structure of the Pit intact. Construction logs indicate that abandoned piping entering the former Pit were plugged, and the former Pit was backfilled with sand and graded. See Appendix I, Exhibit 2 for photographs of the Pit prior to backfilling.

16.2 REGULATORY STATUS

The former Carbose Skimmer Pit was classified as a wastewater treatment unit exempting it from both Federal and State underground storage tank regulations.

16.3 CURRENT CONDITIONS

The contents of the former Carbose Skimmer pit were removed off-site for disposal, piping entering the Pit was plugged, and the excavation was backfilled with clean sand.

16.4 DISCUSSION OF EXISTING DATA

16.4.1 Geology

Surficial materials near AOC 3 (carbose skimmer pit) are similar to AOCs 1 and 2. These materials are heterogeneous but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific properties of surficial materials at the North Works Facility are described in Section 3.4.

16.4.2 Hydrogeology

Groundwater flow near the carbose skimmer pit normally was toward the Detroit River. Groundwater flow is affected by surface infiltration and by the two groundwater extraction wells at the Facility. Most groundwater near AOC 3 now flows toward extraction wells located in the northern part of the Facility (area C on Figure 4-1).

16.4.3 Sampling, Analysis and Waste Characterization

Data from sampling, analyses and waste characterization activities are presented in Appendix I, Exhibit 1, Analytical Report (also included in the January 1993, RCRA 3007 Information Request, Item 2.3.c).

16.5 NATURE AND EXTENT OF CONTAMINATION

There are no records of a release from this unit.

16.6 SUMMARY OF FINDINGS AND RECOMMENDATIONS

During 1992 and 1993 the contents of the former Carbose Skimmer Pit were removed, and it was backfilled with clean sand. No releases are recorded to have occurred from this unit. No further actions are planned during this RFI.

17.0
AOC 4 - NORTH TAR PIT

17.1 BACKGROUND

This North Tar Pit area (Figure 1-2) is well defined and was used for disposal of the coal tar by-product from the Coke Plant (AOC 2). The tar in this area has been covered with limestone fill but during the summer months, the material becomes fluid and buoyancy brings it to the surface. At these times the area is incapable of supporting vehicles or equipment. The placement of the tar was pre-1966. The depth of the deposit is not known. Figure 17-1 shows the general location of the tar pit.

17.2 REGULATORY STATUS

This AOC has no established regulatory status.

17.3 CURRENT CONDITIONS

The area is not used and there is restricted vehicular access in the summer. It is kept covered with limestone.

17.4 DISCUSSION OF EXISTING DATA

Data specific to this AOC have not been acquired. Two soil borings drilled during the TRIP (see Section 14.0) are located on the northern edge of AOC 4. The borings encounter 2 to 6 ft of "black tar". Analyses of a sample of tar found the following constituents and concentrations.

- Benzene 405 mg/kg

- Toluene 389 mg/kg
- Ethylbenzene 8 mg/kg
- Xylenes 549 mg/kg
- Styrene 116 mg/kg

Other coal-tar constituents probably are present as well.

17.4.1 Geology

Surficial materials near AOC 4 (north tar pit) are similar to AOCs 1 and 2. These materials are heterogeneous but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific properties of surficial materials and North Works are described in Section 3.4.

17.4.2 Hydrogeology

Groundwater flow near the north tar pit naturally was toward the Detroit River. Groundwater flow is affected by surface infiltration and by the two groundwater extraction wells. Most groundwater near AOC 4 now flows toward extraction wells located in the northern part of the Facility (area C on Figure 4-1).

17.5 NATURE AND EXTENT OF CONTAMINATION

The waste may be generally classified as Coal Tar from a Kopper's Coke Plant. It is assumed that there is variability in the deposits since the source of coal was known to vary over the years.

Table 15-1 lists the chemicals that typically occur in the coal tar. The location of the deposit is defined, but its total volume is not known.

17.6 SUMMARY AND RECOMMENDATIONS

AOC 4 is a deposit of coal tar of undetermined volume.

Emphasis will be placed on defining the boundaries and depth of the deposit and on evaluating potential methods of removing or confining the tar. Plans are presented in the QAPP and include a resistivity survey to find the horizontal and vertical extent of the tar, borings (if needed) to confirm the extent, and analyses of the tar for physical and chemical properties to aid in planning a corrective measure.

18.0
AOC 5 - PROPYLENE DICHLORIDE SPILL AREA

AOC 5 is located in the central portion of the facility (Figure 1-2). It overlaps SWMU H that contained a series of filled ditches that extended from the Emergency Containment Pond to Outfall 003. Studies performed by the MDNR in 1981 identified cresols, chloroform, benzene, propylene dichloride (PDC), phenolics, several metals and PNAs near AOC 5. An investigation performed by BASF in 1985 focussed on the distribution of PDC and found concentrations ranging into the thousands of parts per million in soils.

18.1 BACKGROUND

In the early 1960s a salt bed cavity was developed at the North Works for the injection of PDC, a by-product of propylene oxide production at the South Works. The intent and design of the cavity was that the cavity would be competent and the PDC could later be recovered for possible sale or disposal. This cavity was apparently in communication with the older "galleries" of brine cavities previously developed, used and abandoned in the Works and not all of the PDC injected was recovered. The PDC is contained within the bedded salt strata and not believed to be in communication with any aquifers (i.e., the gallery system is competent even if the original cavity was not). The lack of a significant salt water aquifer produced by interaction of groundwater and bedded salt, tends to verify this conclusion. The injection well was plugged in the late 1970s.

PDC was transported from the South Works to the well in railroad tank cars. Hose connections were then used to connect the car to the injection piping. Over the years, spillage occurred during unloading operations. Later estimates put total spillage in excess of 37,000 gallons, based on levels of residual material in the soils. This spillage spread in the groundwaters and soils in the area of the unloading pad to cause contamination of the area now designated as AOC 5. Containment of this contamination was one of the major objectives of the 1986 MDNR Consent Decree.

Infiltrating leachate from AOC 5 into the storm sewer system became a significant problem. Since 1990, the entire drainage system in the area has been reworked to utilize welded joint to eliminate infiltration in to sewer pipe. The presence of PDC in the outfall has been reduced to conform to new lower NPDES permit levels.

18.2 REGULATORY STATUS

This AOC has no recognized regulatory status.

18.3 CURRENT CONDITIONS

AOC 5 is currently an undeveloped area within the North Works where limited construction activity is allowed. The extent of the contamination is influenced by the groundwater extraction system described in Sections 2.3.3 and 3.5. PDC is being removed by this system even though its primary purpose is to control groundwater flow not clean-up the shallow water bearing fill and soils. To date, the equivalent of 21,000 gallons of PDC have been retrieved.

18.4 DISCUSSION OF EXISTING DATA

18.4.1 Geology

Surficial material near AOC 5 are similar to SWMU H. These materials are heterogeneous in content and transmissivity but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Fill materials were used as recently as the early 1980s to fill the former drainage ditches to Outfall 003. Specific properties of surficial materials at North Works are described in Section 3.4.

18.4.2 Hydrogeology

Groundwater flow near AOC 5 historically was into storm sewers and/or toward the Detroit River. Groundwater flow is affected by surface infiltration through heterogeneous materials and by the nine groundwater extraction wells in this area. Most groundwater near AOC 5 is intercepted by extraction wells located in the center of the Facility (area B on Figure 4-1).

18.4.3 Sampling and Analysis

A study was performed during 1985 to define the nature and extent of contamination. A report related to this study is contained in Appendix J. In summary, 43 borings were advanced to depths corresponding to the lake clay (up to 30 ft) and sampled continuously. Each three-ft long section of core was analyzed for PDC. Concentrations of PDC exceeded 10,000 mg/kg at some locations. Elevated concentrations of PDC typically occur in the sand layer.

18.4.4 Characterization of Waste

The original waste material was propylene dichloride (PDC), ethylene dichloride (EDC) and bis-(2-chloroisopropyl)-ether (BCE). Some analytical results indicate that these components are, to a degree, separable in situ by selective absorption on clays and other components of the fill on the site.

18.5 NATURE AND EXTENT OF CONTAMINATION

Propylene dichloride is the primary contaminant at AOC 5. At this time, its aerial extent is believed to be limited to the boundary of the AOC displayed on Figure 1-2.

18.6 SUMMARY AND RECOMMENDATIONS

Distribution of PDC contamination is influenced by the groundwater extraction system currently in place and the redesigned stormwater drainage system.

Investigatory activities during the RFI will focus on the downgradient (eastern) edge of the AOC to assess the extent of PDC in soil and groundwater. The 1985 investigation identified the extent of PDC in the other directions. Analyses will be limited to the chemicals known to have been spilled here (PDC, BCE, and EDC).

Soil samples from borings near the Detroit River will be collected and analyzed. Groundwater samples will be collected and analyzed for compounds listed at 40 CFR 264 Appendix IX.

19.0
AOC 6 - TAR AREA (SOUTH END)

19.1 BACKGROUND

BASF personnel suspect that wastes from the Coke Plant were used to fill low areas on the south part of the facility.

Aerial photographs taken between 1952 and 1967 show a darkened area of ground at AOC 6. This may be where tars and wastes are placed.

Soil contaminated with coal tars was generated from an excavation associated with the repair of groundwater extraction system piping (between extraction wells E2NA and E3NA) (Figure 1-2) in the southern portion of the North Works. Contaminated soil removed from the excavation was sampled and placed in roll-off boxes pending waste characterization.

In April 1992 the contaminated soil was sent off-site to Ross Incineration Services, Inc., Grafton, OH (EPA ID No. OHD 048 415 665) for incineration. Three shipments totaling 60 cubic yards of contaminated soil were sent off-site bearing the EPA hazardous waste code D018 (benzene).

The hazardous wastes or hazardous waste constituents identified at AOC 6 are presented in Table 19-1. For a complete analytical report on the contaminated soil, see Appendix K.

19.2 REGULATORY STATUS

This area has no regulatory status.

19.3 CURRENT CONDITIONS

This area is open and currently undeveloped.

19.4 DISCUSSION OF EXISTING DATA

19.4.1 Geology

Surficial materials near AOC 6 are similar to those at SWMU G. These materials are heterogeneous but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific properties of materials at North Works are described in Section 3.4.

19.4.2 Hydrogeology

Groundwater flow near the tar area was naturally toward the Detroit River. Groundwater flow is affected by surface infiltration through heterogeneous materials and by the groundwater treatment extraction wells at the Facility. Most groundwater near AOC 6 is intercepted by extraction wells located in the southern part of the Facility (Area A on Figure 4-1).

19.4.3 Sampling and Analysis

Chemical constituents detected in this area are listed on Table 19-1. Analyses were performed when contaminated soils were uncovered during pipeline placement.

19.4.4 Waste Characterization

The soils excavated and disposed of from this area displayed the toxicity characteristic of benzene.

19.5 NATURE AND EXTENT OF CONTAMINATION

The contaminants detected in this area during the 1981 investigation are consistent with constituents of coal tar (volatiles, PNAs, phenols, metals). The extent of contamination is unknown.

19.6 RECOMMENDATIONS

A conductivity survey will be used to estimate the horizontal extent of this AOC.

Shallow soil borings will be advanced and examined to confirm the extent of tars at AOC 6. Once the areal extent is found, soil samples will be analyzed for coal tar constituents (Table 15-1) to evaluate potential source control measures. Groundwater will be investigated during the site-wide study. The specific tasks to be performed are presented in the QAPP.

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Current Conditions Report

20.0
AOC 7 - PRUSSIAN BLUE

20.1 BACKGROUND

The Prussian Blue Area (AOC 7) is located in the extreme northwest corner of North Works property north of the Kreelon Building. The location of AOC 7 is shown in Figure 1-2. A map illustrating the former Detroit City Gas Company's compressor station (AOC 7) and surrounding area is presented in Figure 2-8. A representative of the EPA visited the BASF Wyandotte Site on November 3, 1989 regarding the following items:

- Request for information in BASF files regarding the disposition of cyanide-contaminated waste on North Drive (a residential street in the north end of Wyandotte).

- Provided a small sample of unidentified bluish-colored material and asked that BASF analyze it to determine if its origin may have been from the site.

As a result of the EPA's request, a file search was conducted and the sample was analyzed for it's primary constituents. The EPA representative was subsequently contacted by telephone and the following information was conveyed:

- The sample analyses did not fingerprint any of BASF's current or historical operations as the source of the sample.

- There was no information in BASF files that indicated the North Works may be a source of the contaminated soil on North Drive.

Subsequent contact was made with BASF on January 21, 1992 when BASF received an information request regarding the North Drive site from the EPA. The EPA indicated they had reason to believe that BASF's predecessor companies disposed of white powder materials and sent coke oven gas to the North Drive Site. A copy of BASF's response to the initial information request and a subsequent request can be found in Appendix L, Exhibits 1, 2 and 3. In preparing responses to the information requests it was learned that a BASF predecessor company provided coke oven gas to Detroit City Gas Company (a predecessor company to Michigan Consolidated Gas Company) which operated a gas purification operation in the vicinity of AOC 7. Coke oven gas purification is known to produce a by-product called "Prussian Blue" that is ferric ferrocyanide. However, to date there is no evidence to indicate that this operation was the source of the material found on North Drive.

From 1927 to 1937, the Detroit City Gas Company leased a plant site shown in Figure 2-8 for a gas purification facility. They purchased coke oven gas from Michigan Alkali Company, purified it and sold it as heating, cooking, and lighting gas to local residents in the area. Purification consisted of passing the gas through towers containing iron filings. These filings were converted to ferric ferrocyanide, called Prussian Blue, by the impurities in the coke oven gas. Traces of this waste material have been found in the North Works in this leased area. The gas purification operation was only conducted by the Detroit City Gas Company.

20.2 REGULATORY STATUS

This area has no regulatory status.

20.3 CURRENT CONDITIONS

The area is currently undeveloped. There are presently no plans to develop this area although the master site plan has slated this area as a possible location for a secondary site entrance and portions of this area may be utilized for process or utilities functions.

20.4 DISCUSSION OF EXISTING DATA

On February 18, 1994 the EPA visited the site to collect soil samples in the vicinity of AOC 7. BASF received analytical results from EPA, and they are presented on Table 20-2.

BASF analyzed split samples obtained from the EPA. The EPA did not provide a plot illustrating the sample locations. In summary, concentrations of several metals and cyanide exceeded typical background levels published by the MDNR. Several PNA compounds also were present. Analytical results are summarized on Table 20-1.

20.4.1 Geology

Surficial materials near AOC 7 are similar to AOC 3. These materials are heterogeneous but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific properties of subsurface materials at North Works are described in Section 3.4.

20.4.2 Hydrogeology

Groundwater flow near the Prussian Blue area historically was north toward Perry Place. Groundwater flow is affected by surface infiltration through heterogeneous materials and by the two groundwater extraction wells nearby. Groundwater now may flow toward extraction wells located in the northern part of the Facility (Area C on Figure 4-1).

20.5 NATURE AND EXTENT OF CONTAMINATION

The nature of contamination appears limited to inorganics and PNAs. These compounds are consistent with the gas purification process once operated at this location. The extent of contamination is unknown.

20.6 RECOMMENDATIONS

BASF will use a cable trenching tool (a "Ditch-Witch") and possibly shallow soil borings to obtain soil samples and examine them for the characteristic color of Prussian Blue. Once the obvious horizontal and vertical extent are found soil samples will be collected and analyzed for RCRA metals and total cyanide.

21.0
AOC 8 - STYRENE SPILL AREA

21.1 BACKGROUND

AOC-8, the styrene spill area, is shown on Figure 1-2. An estimated 15,000 gallons of styrene were released to the soil over a period of several weeks. Styrene leaked through an imperfect weld at the bottom of a new above ground storage tank that escaped detection during fabrication, testing, and commissioning. The styrene storage tank was installed in July 1975. The spilled material, which is lighter than water, migrated to groundwater where it floated on top of the water table and collected in a nearby electrical manhole.

The spill was discovered on August 27, 1975 and recovery efforts were initiated the following day by an emergency response contractor. By September 5, 1975 approximately 52% of the spilled material had been recovered, continuing efforts recovered an additional indeterminate amount of styrene.

21.2 REGULATORY STATUS

This area has no regulatory status.

21.3 CURRENT CONDITIONS

Styrene contamination presently exists in the soil, groundwater and underground electrical conduit piping within the area shown in Figure 1-2. Occasional detections during routine health and safety air sampling of manholes accessing the electrical conduit confirms its presence in this system.

Detection of styrene during the Toluene Remediation Project (AOC 1) further support its presence in the soil and groundwater of this area.

21.4 DISCUSSION OF EXISTING DATA

Data from this area coincides with data acquired during the Toluene Remediation Project (AOC 1). Additional data are not available.

21.4.1 Geology

Surficial materials near AOC 8 are similar to AOCs 1 and 2 and SWMU D. These materials are heterogeneous but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific properties of surficial materials at North Works are described in Section 3.4.

21.4.2 Hydrogeology

Groundwater flow near the styrene spill area was naturally toward the Detroit River. Groundwater flow is affected by surface infiltration through heterogeneous materials and by the two groundwater extraction wells in this area. Groundwater near AOC 8 is intercepted by extraction wells located in the northern and center parts of the Facility (Areas B and C on Figure 4-1).

21.5 NATURE AND EXTENT OF CONTAMINATION

The September 15, 1975 report indicates that approximately 7,200 gallons of spilled styrene remained unrecovered. This overestimates the quantity remaining since recovery continued after the estimate was made.

During a two year period after the spill, groundwater and styrene were removed from various locations in the electrical manhole system throughout the site. At times, the removal rate was approximately 2,000 gals/day. Since then, styrene vapors have continued to be detected during industrial hygiene monitoring of workplaces in the electrical manhole system. Figure 21-1 details the electrical manhole system. It indicates those electrical manholes where (1) material was pumped out during the 2-year period after the spill and (2) industrial hygiene monitoring has indicated the presence of styrene vapors.

21.6 RECOMMENDATIONS

The location of the styrene spill is within AOC 1. The distribution of styrene and potential corrective measures will be evaluated during the on-going interim measure for AOC 1. Periodic pumping of water and styrene from electric manholes will continue. A long-term remedy will be evaluated with the site-wide groundwater investigation and corrective measures study.

22.0
AOC 9 - PROPYLENE OXIDE SPILL AREA

22.1 BACKGROUND

AOC 9 is shown on Figure 1-2. An estimated 46,000 gallons of propylene oxide was released to the soil over a period of ten to fourteen days during August 1987. The cause was external corrosion of an underground transfer line.

The release was discovered on August 18, 1987 and resulted in activation of the fire water deluge system to minimize the explosion hazard from vapors and direction of additional water from fire hoses at the spill area. More than three million gallons of water was applied over a period of two days.

After safety in the area was assured, the extraction of groundwater from several pits surrounding the spill site was initiated. Groundwater recovery was enhanced by digging additional pits and installing temporary groundwater extraction wells. Extracted groundwater was transported to a lined basin at the south end of the site where dissolved propylene oxide was converted to propylene glycol. By September 2, 1987 propylene oxide concentrations in the extracted groundwater were low enough to allow discharge into the POTW sewer.

Propylene oxide dissolves readily in water, and it reacts with water to form propylene glycol. This reaction is catalyzed by caustic substances, such as the alkaline soils at this facility.

Propylene oxide and its water-reaction products are easily biodegraded by naturally occurring soil bacteria; some soil bacteria have been shown to thrive in groundwater with propylene oxide concentration as high as 333 mg/l. Propylene glycol is an aliphatic alcohol that degrades to ketones and aldehydes and eventually into organic acids.

Response efforts to extract groundwater resulted in the development of an effective cone of depression that prevented the migration of contaminants. During the time that a cone of depression in the water table was sustained, groundwater samples were analyzed for propylene oxide and propylene glycol until their concentrations were below the action levels of 250 mg/l for propylene oxide and 3,000 mg/l for propylene glycol. In addition, total bacteria in groundwater samples were monitored until their concentrations were above the action level of 100 organisms/ml.

22.2 REGULATORY STATUS

This area has no regulatory status.

22.3 CURRENT CONDITIONS

Active remediation and monitoring for propylene oxide and its degradation products is not being performed.

22.4 NATURE AND EXTENT OF CONTAMINATION

Contamination as a result of the spill consists of propylene oxide, propylene glycol, and their degradation products. The extent of contamination is unknown, but emergency recovery efforts that followed spillage probably contained the chemicals within the immediate area.

22.4.1 Geology

Surficial materials near AOC 9 are similar to SWMU E. These materials are heterogeneous but generally consist of industrial fill overlying lake sand, clay, and dolomite bedrock of the Dundee or Detroit River Group. Specific characteristics of surficial materials at North Works are described in Section 3.4.

22.4.2 Hydrogeology

Groundwater flow near the propylene oxide spill area historically was north toward Perry Place or east toward the Detroit River. Groundwater flow is affected by surface infiltration and by the two groundwater extraction wells in this area. Most groundwater near AOC 9 is intercepted by extraction wells located in the northern part of the Facility (Area C on Figure 4-1).

22.5 RECOMMENDATIONS

Groundwater samples from monitoring wells near this area will be analyzed for propylene glycol and propylene oxide in addition to chemicals listed at 40 CFR 264 Appendix IX. The site-wide groundwater corrective measures study will evaluate potential actions at this AOC. No further activities are planned because, at the present time, neither the spilled material nor its environmental breakdown products are hazardous waste or hazardous waste constituents.

23.0
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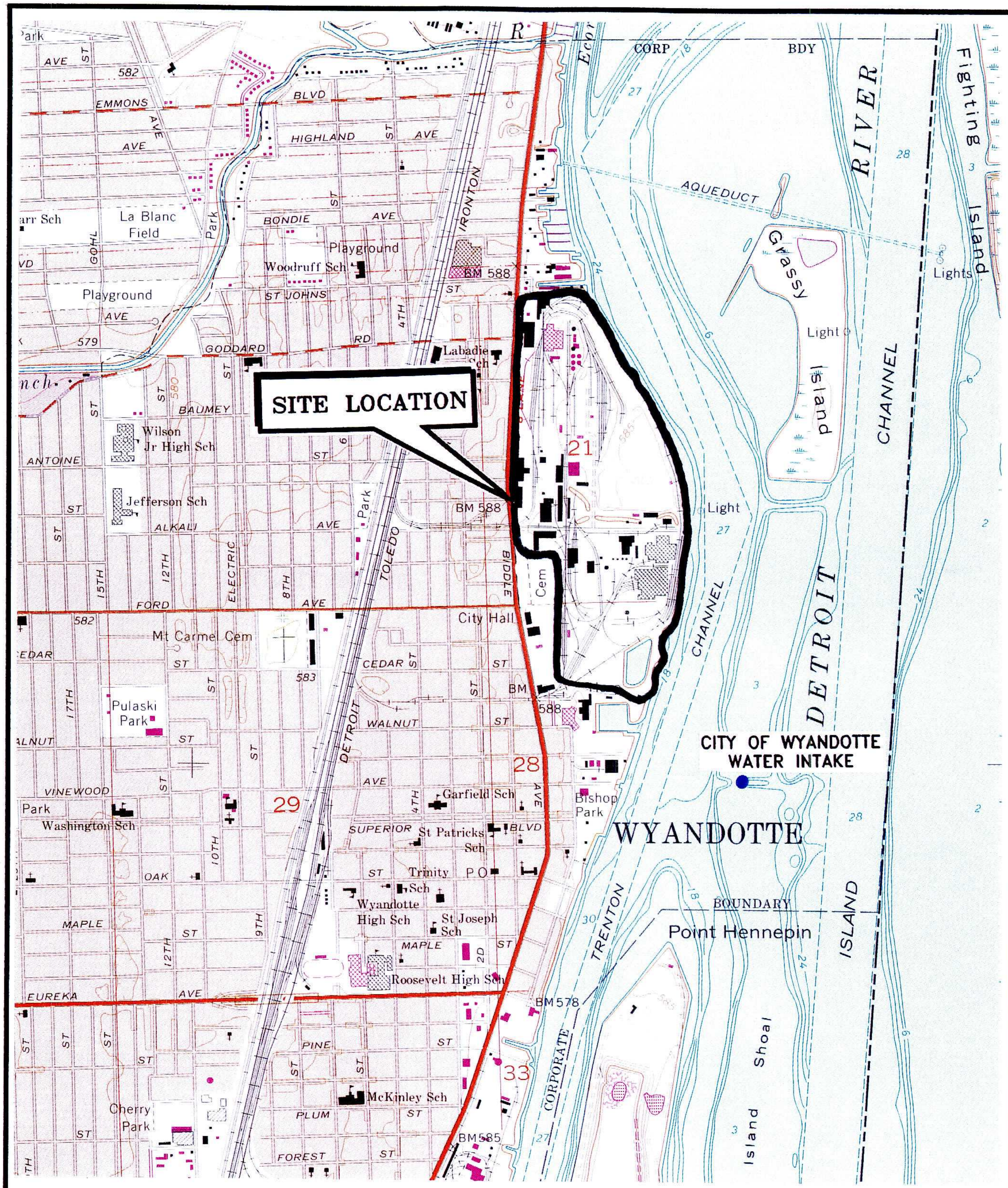
Figures



CONTOUR INTERVAL 5 ft

WYANDOTTE QUADRANGLE
7.5 MINUTE SERIES, 1967
PHOTOREVISED 1981

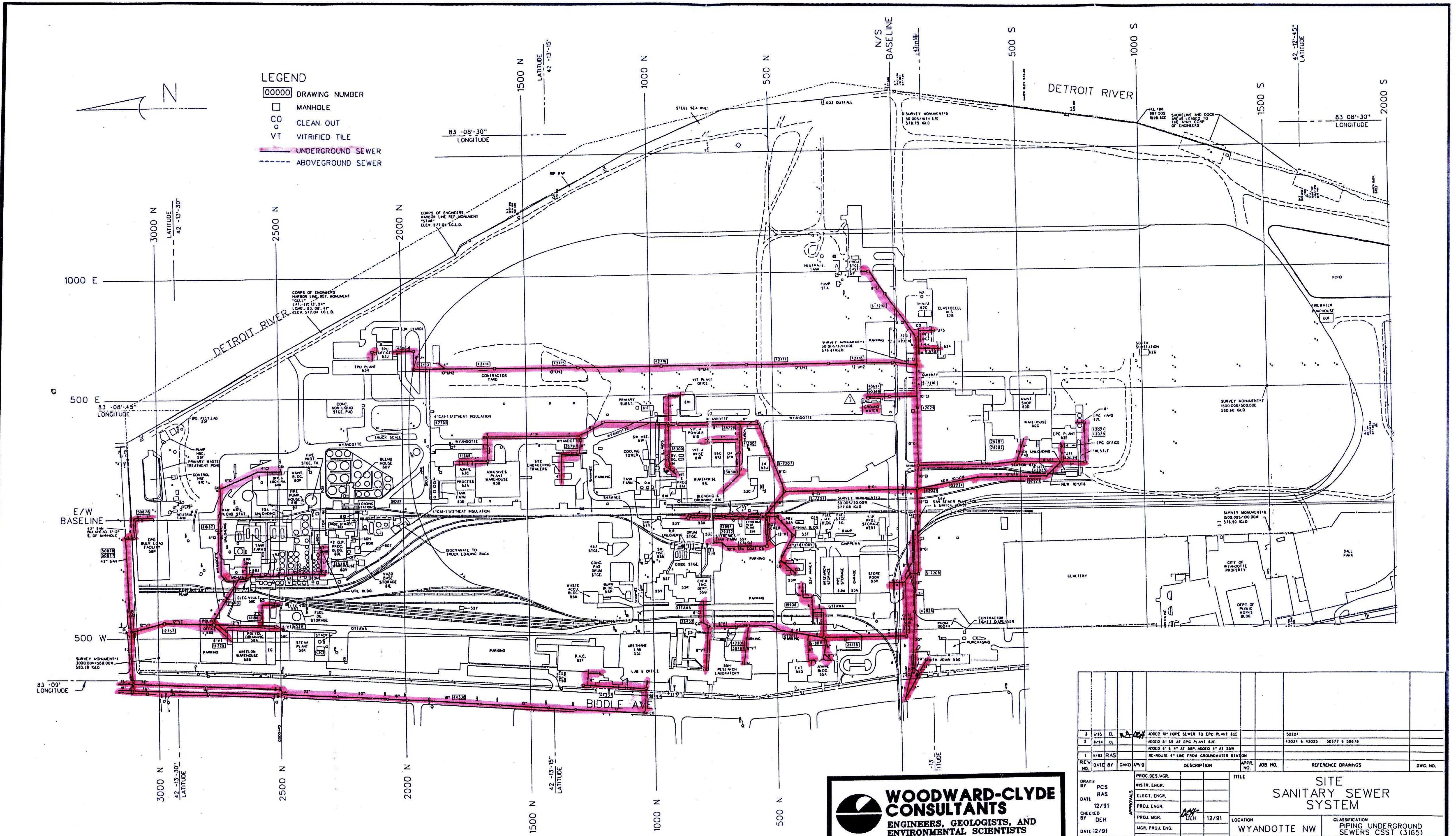
1000 0 1000 2000 3000 4000 5000 FEET

[ACAD]E:\DWG\STAN\SITEMAP

Woodward–Clyde Consultants
ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS

BASF CORPORATION
WYANDOTTE, MICHIGAN
SITE LOCATION MAP

DESIGN:	–	CHK'D:	JL	PROJECT NO.	FIG. NO.
DRAWN:	DAS	DATE: 6/21/94		4E07014	1-1



REV NO.	DATE	BY	CHKD	APV'D	DESCRIPTION	APPR. NO.	JOB NO.	REFERENCE DRAWINGS	DWG. NO.
3	1/95	EL	RA	DEH	ADDED 10" HDPE SEWER TO EPC PLANT 82E			52224	
2	8/94	EL			ADDED 8" SS AT EPC PLANT 82E.			42024 & 42025 50877 & 50878	
					ADDED 8" & 4" AT 58P. ADDED 4" AT 55W				
1	9/92	RAS			RE-ROUTE 4" LINE FROM GROUNDWATER STATION				

WOODWARD-CLYDE CONSULTANTS
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PROJECT NUMBER **4E07014** FIGURE NUMBER **2-30**

DRAWN BY PCS RAS
DATE 12/91
CHECKED BY DEH
DATE 12/91

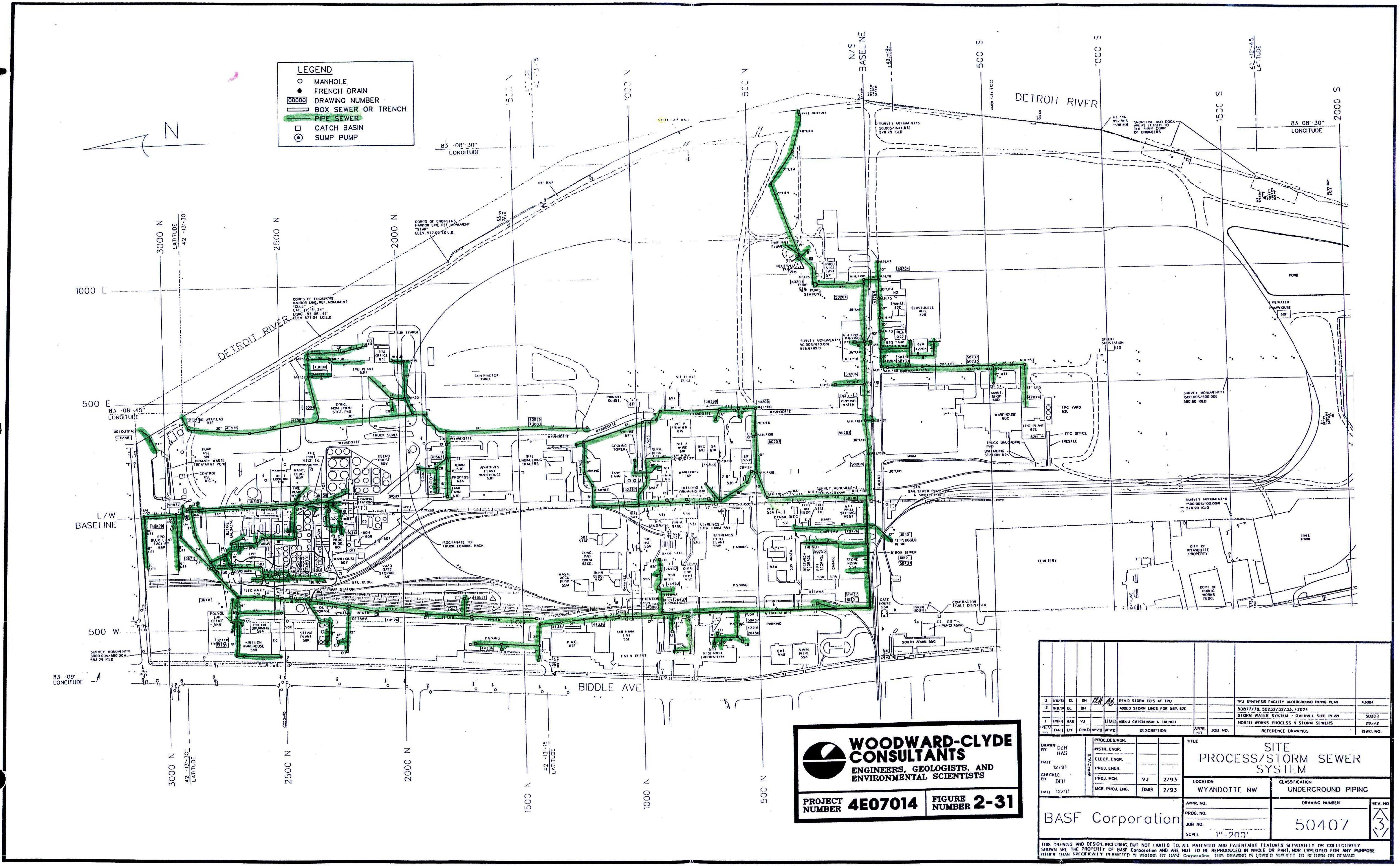
APPROVALS
PROC.DES.MGR.
INSTR. ENGR.
ELECT. ENGR.
PROJ. ENGR.
PROJ. MGR. DEH 12/91
MGR. PROJ. ENG.

TITLE
SITE SANITARY SEWER SYSTEM

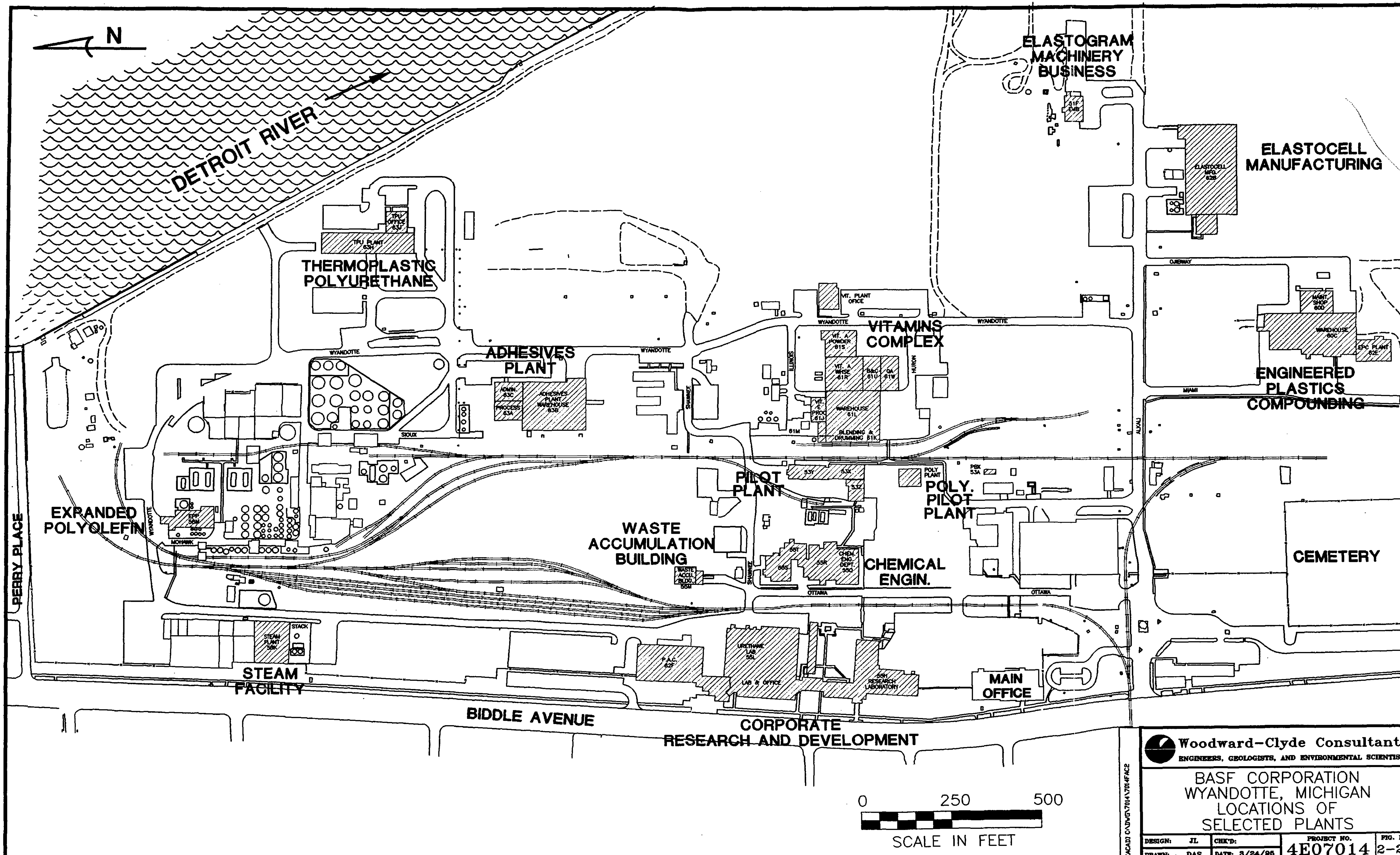
LOCATION WYANDOTTE NW
CLASSIFICATION PIPING UNDERGROUND SEWERS CSST (3165)

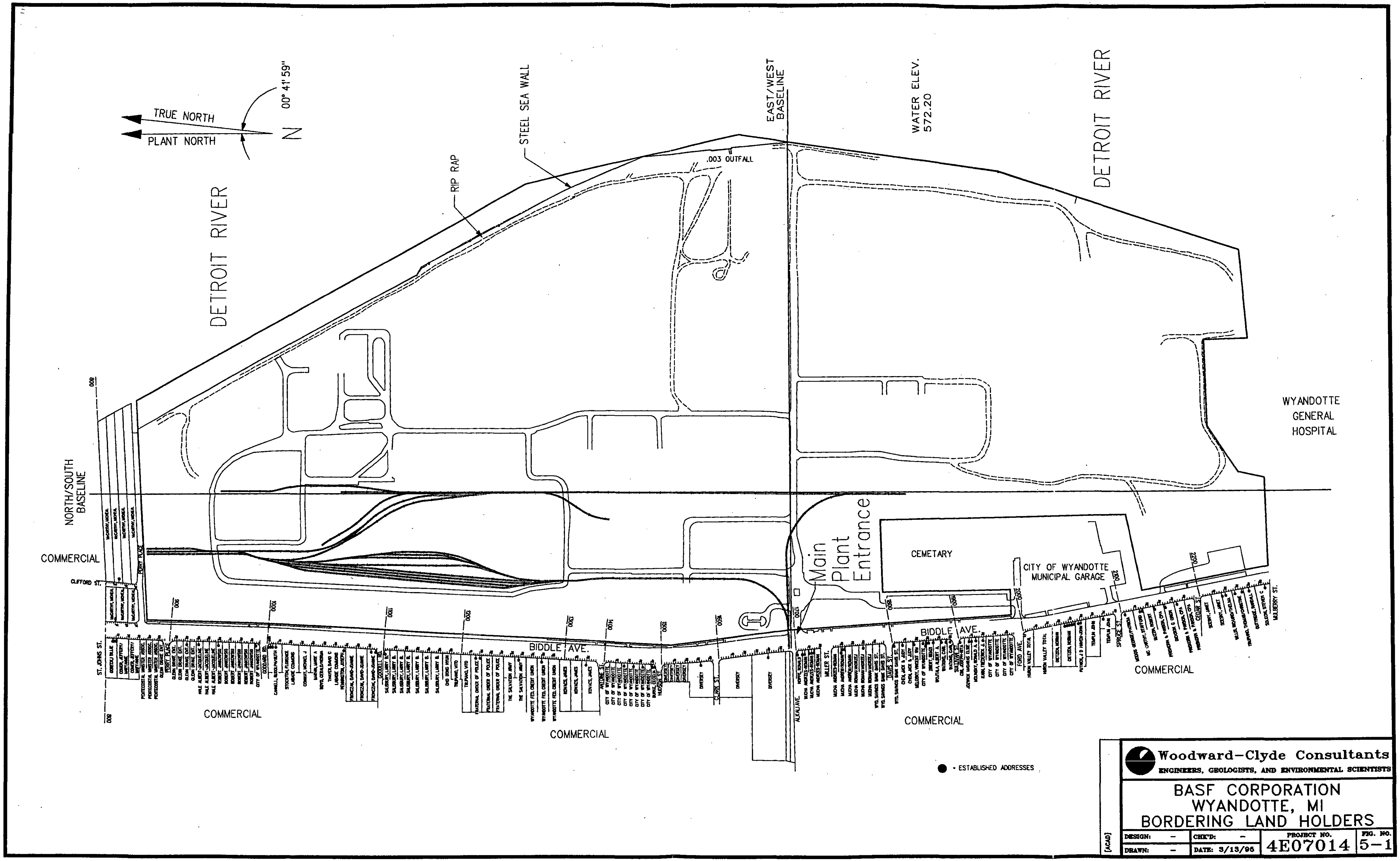
BASF Corporation

APPR. NO.
PROG. NO.
JOB NO.
SCALE 1"=200'
DRAWING NUMBER 50406
REV. NO 3



LEGEND
MANHOLE
FRENCH DRAIN
DRAWING NUMBER
BOX SEWER OR TRENCH
PIPE SEWER
CATCH BASIN
SUMP PUMP
N
DETROIT RIVER
BIDDLE AVE
N/S BASELINE
C/W BASELINE
WOODWARD-CLYDE CONSULTANTS
ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS
PROJECT NUMBER 4E07014
FIGURE NUMBER 2-31
SITE PROCESS/STORM SEWER SYSTEM
LOCATION WYANDOTTE NW
CLASSIFICATION UNDERGROUND PIPING
BASF Corporation
SCALE 1"=200'
50407


N
DETROIT RIVER
THERMOPLASTIC POLYURETHANE
TPU PLANT 63H
ADHESIVES PLANT
ADMIN. 63C
PROCESS 63A
ADHESIVES PLANT WAREHOUSE 63B
ELASTOGRAM MACHINERY BUSINESS
ELASTOCELL MANUFACTURING
VITAMINS COMPLEX
VIT. PLANT OFFICE
WAREHOUSE 61L
ENGINEERED PLASTICS COMPOUNDING
WAREHOUSE 60C
EPC PLANT 62E
PILOT PLANT
POLY. PILOT PLANT
WASTE ACCUMULATION BUILDING
CHEMICAL ENGIN.
CEMETERY
EXPANDED POLYOLEFIN
PERRY PLACE
STEAM FACILITY
STEAM PLANT 56K
STACK
P.A.C. 62F
URETHANE LAB 55L
LAB & OFFICE
55H RESEARCH LABORATORY
MAIN OFFICE
BIDDLE AVENUE
CORPORATE RESEARCH AND DEVELOPMENT
WYANDOTTE
OTTAWA
SIOUX
SHAWNEE
MOHAWK
MIAMI
OJIBWAY
0 250 500
SCALE IN FEET
Woodward-Clyde Consultants
ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS
BASF CORPORATION
WYANDOTTE, MICHIGAN
LOCATIONS OF
SELECTED PLANTS
DESIGN: JL
DRAWN: DAS
CHK'D:
DATE: 3/24/95
PROJECT NO. 4E07014
FIG. NO. 2-24

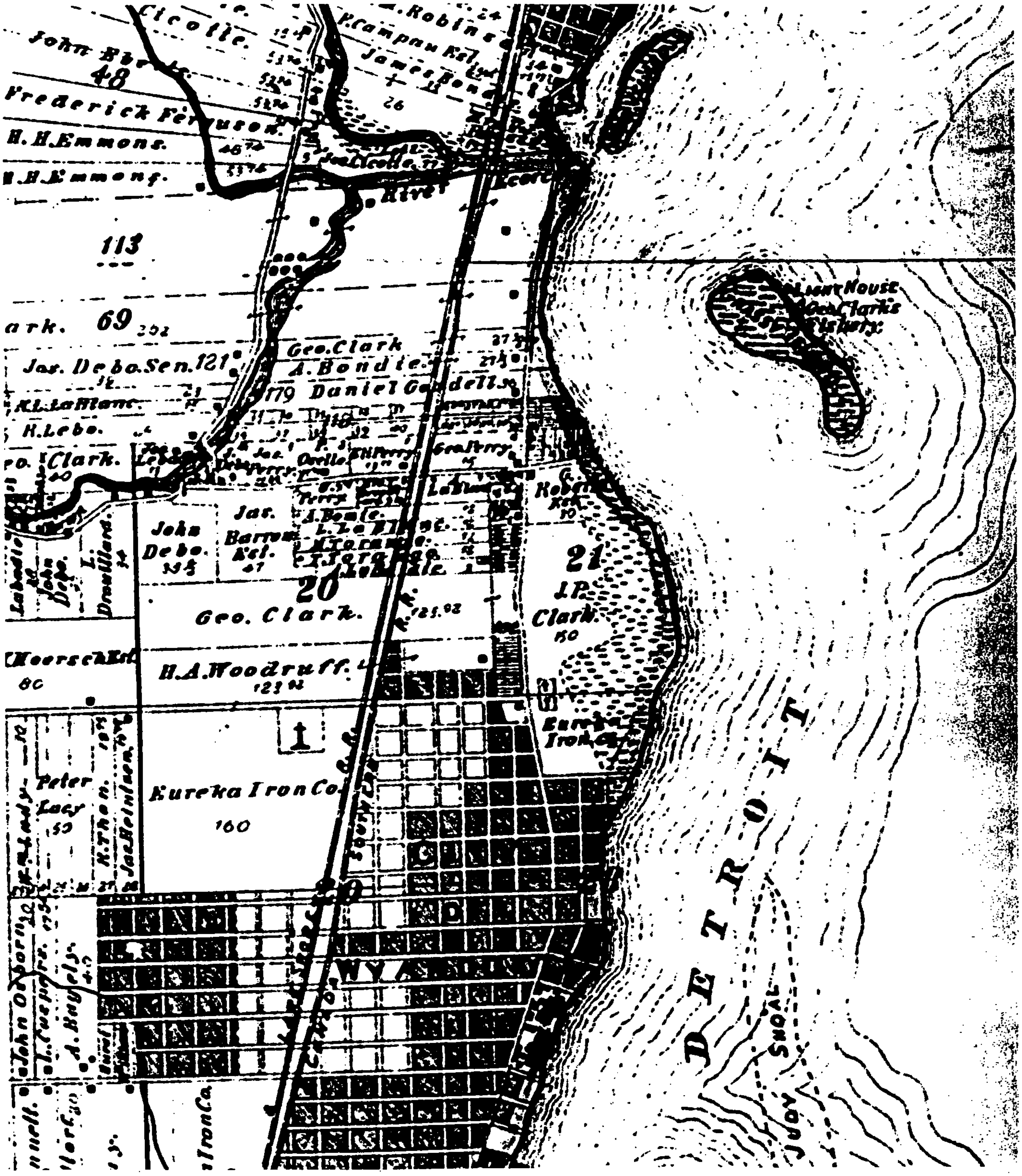


Woodward-Clyde Consultants
ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS

BASF CORPORATION
WYANDOTTE, MI
BORDERING LAND HOLDERS

DESIGN: –	CHK'D: –	PROJECT NO.	FIG. NO.
DRAWN: –	DATE: 3/13/96	4E07014	5-1

[ACAD]



SOURCE: ALLEN PARK HISTORICAL SOCIETY

Woodward–Clyde Consultants
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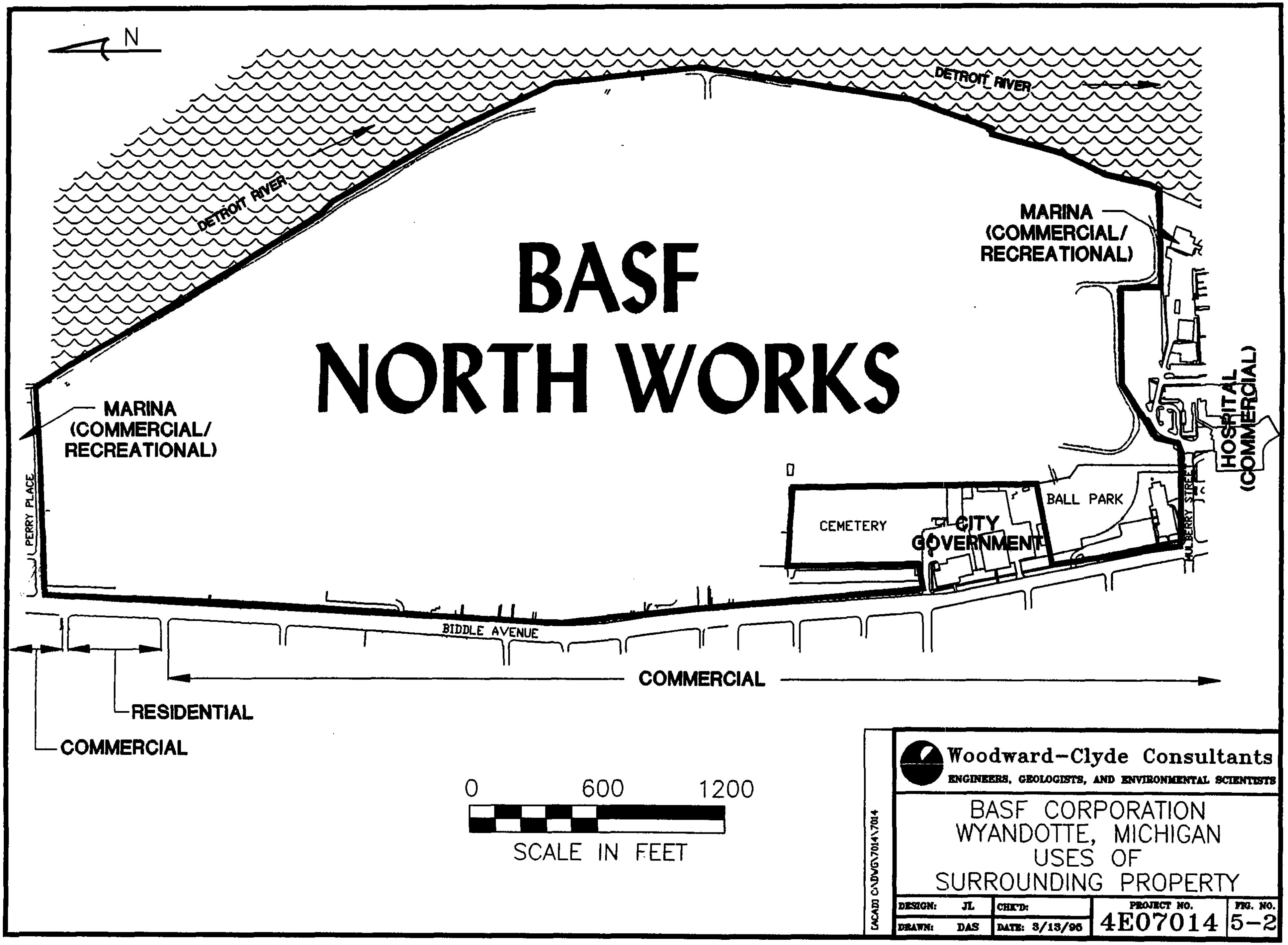
BASF CORPORATION
FACILITY LOCATION PRIOR
TO INITIAL DEVELOPMENT
1876

[ACAD]	DESIGN: –	CHK'D: JL	PROJECT NO.	FIG. NO.
	DRAWN: –	DATE: 3/10/95	5E07014	1-2A


N
DETROIT RIVER
DETROIT RIVER
BASF
NORTH WORKS
MARINA
(COMMERCIAL/
RECREATIONAL)
MARINA
(COMMERCIAL/
RECREATIONAL)
HOSPITAL
(COMMERCIAL)
PERRY PLACE
MULBERRY STREET
CEMETERY
CITY
GOVERNMENT
BALL PARK
BIDDLE AVENUE
COMMERCIAL
RESIDENTIAL
COMMERCIAL
0
600
1200
SCALE IN FEET
Woodward-Clyde Consultants
ENGINEERS, GEOLOGISTS, AND ENVIRONMENTAL SCIENTISTS
BASF CORPORATION
WYANDOTTE, MICHIGAN
USES OF
SURROUNDING PROPERTY
DESIGN: JL
CHK'D:
DRAWN: DAS
DATE: 3/13/95
PROJECT NO.
4E07014
FIG. NO.
5-2

Tables

TABLE 2-1

SOLVAY PROCESS
DBO ANALYSIS

	STILL 10/70	COMPOSITE 4/65	No. 9 LINE 10/70	No. 10 LINE 10/70	PURECAL SUMP 10/70
LIQUOR PHASE					
pH	11.1	11.0	11.5	11.5	7.7
% Calcium	4.4	4.84	2.84	2.80	0.12
% Magnesium	0.11	0.04	0.02	0.02	--
% Sodium	2.29	2.37	1.19	1.17	0.44
Total CO_2%	0.01	0.01	0.01	0.01	0.02
Total S as Sulfate	0.05	0.04	0.09	0.09	0.01
% Chloride	12.43	12.21	6.82	6.82	0.92
WET SOLIDS					
% H_2O	39.6	52.26	50.7	51.2	51.85
% Calcium	28.0	37.6	31.6	30.4	38.2
% Magnesium	3.6	2.84	4.44	4.44	0.24
% Total CO_2	9.11	14.74	16.74	16.18	41.85
% Total S as Sulfate	11.72	9.62	6.58	7.84	0.12
% Chloride	16.26	14.34	9.08	9.79	0.07
TOTAL STREAM					
% Suspended Solids	1.47	2.08	0.96	1.07	0.27
% Chloride	12.39	12.10	7.17	7.07	1.06
% Total NH_3	0.002	0.0007	0.001	0.001	0.002

TABLE 2-2

COMPOUNDS IDENTIFIED IN SOIL OR GROUNDWATER DURING 1981 INVESTIGATION

Aniline
Acrylonitrile
Aminoethylcarbonate
Anthracene
Acenaphthylene
Benzene
Benzoic Acid
bis (2-Chloroisopropyl) phthalate
bis (Ethylhexyl) adipate
Benzofuran
Benzo (k) flouranthene
Benzo (a) pyrene
bis (Ethylhexyl) phthalate
Chloroform
Chlorocresol
Cadmium
Cresol
Chromium
Chrysene
Copper
2,4 dimethylphenol
Decanoic Acid
Dichloropropane
Dichlorophenol
Diethylphthalate
2,3 Dihydroindene
Dimethylbenzylbenzene
Dimethylbiphenyl
Dimethyethylbenzene
Dimethylmethoxybenzofuran
Dimethylnaphthalene
Dioctylphthalate
Diphenylsulphone
Dimethylphenol
Ethylbenzene
2-Ethylhexanol
Ethylpyridine
Fluorene
Fluoranthene
Hexachlorobutadiene
Indene
Indane
Isopropylbenzene
Methylanaline
Methylene Chloride
Methylnaphthalene
Methylphenylacetylene
Methylstyrene
2-Methylthiophene
Naphthalene
Nonylphenol
Pyrene
Phenyl Acetic Acid
Lead
Pyridine
Phenyl Ethyl Acetic Acid
Phenol
Phenanthrene
Styrene
Toluene
Trichlorobenzene
Tetrachlorobutadiene
Toluenediamine
Trimethylbenzene
Tetramethylsuccimonitrite
Thiophene
Xylene
Xanthene
Zinc

TABLE 2-3
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES REPORTED TO A GOVERNMENT AGENCY[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N) [2]	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [3]	QUANTITY RECOVERED [3]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
6/16/94	N/A	Y, POTW	Polyols	Polyols	250 gal.	0	POTW	Closed valve, reviewed SOPs, conduct refresher training.
5/19/94	N/A	Y, DNR	Water with traces of Propylene Oxide and Toluene	Polyols	600,000 gal.	0	Water	Closed valves to isolate leaks, replaced piping.
9/7/93	N/A	Y, POTW	Vitamin E (Tocopherol Acetate)	Vitamins	411 lb	0	POTW	Covered Floor Drain, Repaired Piping
8/18/93	N/A	Y, POTW (8/27)	Caramel Color	Vitamins	200 lb	0	POTW	Pump Turned Off/Cleaned Up Area
5/19/93	N/A	Y, POTW (5/24)	Geo-Guard® Emulsified Mineral Oil	Vitamins	20 gal	0	POTW	
3/8/93	N	Y, POTW	Mixture	R&D Isocyanates	2,4-Toluenediamine 0.2 lb Ethanol 0.4 lb Acetone 0.2 lb	0	POTW	
2/21/93	N	Y, POTW (2/26)	Methanol	Vitamins	≈ 80 gal	0	POTW	Valve Closed, Controller Repaired
12/10/92	N/A	Y, POTW	Zinc Chloride & Zinc Hydroxide	Vitamins	25 kg	0	POTW	Reinstalled Filter Paper, Increased Inspections
5/26/92	N	Y, POTW	Nitric Acid (34%)	Research Services	640 lb	0	POTW	Contaminated Area Cleaned Up
10/8/91	N	Y, MDNR-ERD	Acrylonitrile	Polyols	< 8 lb	0	Land	Stopped Leak, Packing Nut Tightened

TABLE 2-3 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES REPORTED TO A GOVERNMENT AGENCY[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N) [2]	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [3]	QUANTITY RECOVERED [3]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
1/30/91	N	Y, DNR,NRC,LEPC (verbal)	Propylene Oxide	Polyols	16 lb	0	Air	Stopped Leak
10/5/90	Y	Y	Propylene Oxide	Polyols	3,500 lb	0	Water	Valve Closed
6/28/90	N/A	Y	#6 Fuel Oil	Steam Facility	< 500 gal	< 500 gal	Land	Excavated Contaminated Soils
6/28/90	Y	Y	Propylene Oxide	Polyols	1,100 lb	0	Air/Water	System Shutdown, Replaced Gaskets
3/9/90	N/A	Y, POTW	Vitamin E	Vitamins	2,200 lb	0	POTW	Shut Down System, Replaced Pump Packing
11/13/89	N	Y, MDNR	Acrylonitrile	Polyols	< 1 pt	0	Air	Cleaned Up Area
11/12/89	N	Y, MDNR	Acrylonitrile	Polyols	1 oz	0	Air	Cleaned Up Area, Sight Glass Removed From Transfer Line
8/18/87	Y	Y	Propylene Oxide	Polyols	58,000 lb	-	Land	Isolated Leak
5/25/87	Y	Y	Ethylene Oxide	Polyols	<500 lb	0	Air/POTW	Valve Closed
3/10/87	Y	Y	Propylene Oxide	Polyols	< 375 lb	-	Air	
2/15/87	Y	Y	Ethylene Oxide	Chemical Engineering	7 lb	0	Air	Valve Closed
11/20/86	N	Y	Styrene	Polyols	≈ 2 gal	-		
8/14/79		Y, PEAS# 1368	Caustic					
6/27/79		Y, PEAS# 1076	Brine					
3/1/79		Y, PEAS# 274	Polyol		3,000 gal			
1/23/79		Y, PEAS# 88	Oil		2,000 gal			

TABLE 2-3 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES REPORTED TO A GOVERNMENT AGENCY[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N) [2]	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [3]	QUANTITY RECOVERED [3]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
1/23/79		Y, PEAS# 93	Polyol		6,000 gal			
1/23/79		Y, PEAS# 93	Ethylene Diamine	Polyols	500,000 gal		Water	Pumped into RR Cars
9/8/78		Y, PEAS# 1214	Polyol		5,000 gal			
8/28/78		Y, PEAS# 1147	Basalin	Chemical Engineering	< 6,000 gal			
4/29/78		Y, PEAS# 531	Sodium Hydroxide		2,500 lb			
4/27/78		Y, PEAS# 517	Polyol		600 gal			
4/5/78		Y, PEAS# 160	Polyol		5,000 gal			
6/11/76		Y, PEAS# 0715-76	Ammonia Liquor	Soda Ash	5,700 lb			
4/11/76		Y, PEAS# 0452-76	DBO Liquor	Soda Ash	30,000 gal			
3/22/76		Y, PEAS# 0132-76	Oil/Toluene					
1/10/76		Y, PEAS# 0029-76	Toluene					
12/5/75		Y, PEAS# 1485-75	Ammoniated Brine	Soda Ash	17,000 lb			
12/1/75		Y, PEAS# 1474-75	Toluene		1,500 lb			
11/10/75		Y, PEAS# 1408-75	Ammonia	Soda Ash	2,000 gal			

TABLE 2-3 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES REPORTED TO A GOVERNMENT AGENCY[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N) [2]	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [3]	QUANTITY RECOVERED [3]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
10/19/75		Y, PEAS# 1322-75	Ammonia	Soda Ash	2,000 gal			
8/27/75		Y, PEAS# 1072-75	Styrene	Polyols	15,000 gal	8,400 gal	Land	Recovery Continuing
6/23/75		Y, PEAS# 0752-75	Dichloropropane		< 70 gal			
6/23/75		Y, PEAS# 0753-75	Polyol		10,000 gal			
6/17/75		Y, PEAS# 0752-75	Calcium Chloride	Soda Ash	20,000 gal			

<u>Note:</u>

1 This table represents spills/releases that potentially were released to the environment. This does not include spills/releases of materials which occurred within a containment area or building and where mitigated without impact to the environment.

2 Copies of written correspondences with the government agencies has been included as an attachment to the table.

3 Units of Measure:
g - gram gal - gallon
kg - kilogram lb - pound oz - ounce

TABLE 2-4
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
8/12/94	NA	N	Calcium Stearate, Irganox 1098 Loxiol VPG-861	EPC	~ 1 lb	0.5 lb	Land	Sweep up residue, clean sewer.
8/5/94	NA	N	Calcium Stearate, Irganox 1098 Loxiol VPG-861	EPC	≈ 2 lb	<2 lb	Land	Sweep up residue, clean sewer.
7/15/94	NA	N	Polyol	Polyols	20-30 gal	0	Land	Closed valve.
3/21/94	N	N	Hydrogen Chloride (Anhydrous)	Vitamins	≈ 100 lb	0	Air	Closed Value, Shut Down System, Replaced Piping
12/25/93	N	N	Methylene Chloride	Urethane Applications	≈ 330 lb	0	Air	Stopped Drum Leak, Contained Spill
12/9/93	N/A	N	Gasoline	Energy Chms. R&D	≈ 5 gal	5 gal	Land	Contaminated Soil Removed
10/1/93	N/A	N	Hydraulic Oil	Vitamins	≈ 1 gal	1 gal	Land	System was Locked Out, Contaminated Soil Removed
8/13/93	N/A	N	Heptane	Vitamins	< 40 gal	0	Air/POTW	Repaired Piping
8/3/93	N/A	N	Diesel Fuel	Site Engineering	5 gal	5 gal	Land	Pump Shut Off, Contaminated Soil Removed
7/14/93	N	N	Freon R-11	R&D Applications	2 kg	0	Air	None, Flaw in Glass Bottle
6/9/93	N	N	Toluene Diisocyanate	Polyols	5 lb	5 lb	Land	Contained Drips, Contaminated Soil Removed, Gaskets Replaced

TABLE 2-4 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
5/11/93	N	N	Ethylene Oxide	Polyols	< 1 lb	0	Air	Stopped Leak, Shut Down System, Replaced Hose
4/21/93	N	N	Pyridine	R&D Stores	≈ 4 lb	0	Air	Contaminated Area Cleaned Up, Cause -Broken Glass Container
12/18/92	N/A	N	Propane	Project Storage	3,092 lb	0	Air	Closed Valve, Repaired Line
10/23/92	N/A	N	Hydraulic Oil	Project Storage	<1 lb	All	Land	Contaminated Soil Removed, Unit Drained
10/7/92	N/A	N	Silicon Dioxide	Vitamins	55.5 kg	55 kg	Land	Contaminate Area Cleaned Up
8/4/92	N	N	Aniline	Research Services	<1 lb	0	Air	Contaminated Area Cleaned Up
8/1/92	N/A	N	Cooking Oil	East of Vitamins Administration	< 10 gal	< 10 gal	Land	Contaminate Soil Removed
7/10/92	N/A	N	Transmission Fluid	Truck Scale	30 gal	30 gal	Land	Contaminated Soil Removed, Replaced Filter on Truck
6/7/92	N	N	Hydrogen Chloride (Anhydrous)	Vitamins	5 lb	0	Air	Valve Closed, Shut Down System, Replaced Gasket
5/27/92	N/A	N	Silicon Dioxide	Vitamins	50 kg	25 kg	Air/Land	Contaminated Area Cleaned Up
5/20/92	N/A	N	Chlorodifluoro-methane	Vitamins QA	55 lb	0	Air	Repaired Actuator

TABLE 2-4 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
5/11/92	N	N	Phosphoric Acid	Adhesives / Phosphates	0.5 gal	0	Air	Contaminated Area Cleaned Up, Neutralized, Replaced Gasket
4/24/92	N/A	N	Chlorodifluoro-methane	Vitamins	5 lb	0	Air	Upgraded and Replaced Valve
4/6/92	N	N	50% Caustic Soda	Steam Facility	380 lb	0	Land	Contaminated Area Flushed w/ Water
4/5/92	N/A	N	Polyol	Polyols	5 gal	_	Land	Contaminated Area Cleaned Up
3/14/92	N/A	N	Heptane	Vitamins	10 gal	0	POTW	Stopped Flow, Valve Operation Reviewed
3/8/92	N/A	N	Heptane	Vitamins	≈ 50 lb	0	Air	Shut Down System, Replaced Tank
2/11/92	N	N	Toluene Diisocyanate	Polyols	6 oz	_	Land	Neutralized, Unloading Procedure revised
1/6/92	N	N	Methanol	Vitamins	225 lb	0	Air/POTW	Shut Down System, Repaired Column
12/20/91	N	N	Mercury	Vitamins	< 0.002 lb	0	POTW	Contaminated Area Cleaned Up, Cause - Broken Thermometer
12/13/91	N	N	Toluene Diisocyanate	Polyols	< 3 gal	_	Land	Contaminated Area Cleaned Up, Inspected Flanges & Gaskets

TABLE 2-4 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
11/19/91	N/A	N	Dowtherm® (50% biphenyl phenyl ether 40% biphenyl oxide	Vitamins	< 100 lb	0	Air/POTW	Contaminated Area Cleaned Up
11/7/91	N/A	N	Butane	EPO	≈ 15 lb	0	Air	Closed Valve
11/1/91	N/A	N	Butane	EPO	≈ 1 lb	0	Air	Closed Valve
10/4/91	N	N	Hydrogen Chloride (Anhydrous)	Vitamins	20 lb	0	Air	Closed Valve
9/24/91	N	N	HCL (Anhydrous)	Vitamins	< 2 lb	0	Air	Shut Down System, Repaired Welded Flange
9/3/91	N/A	N	Mepiquat Chloride (PIX®)	Research Services	≈ 20 g	0	Air/POTW	Cleaned Up Contaminated Area
8/2/91	N/A	N	Heptane	Vitamins	< 2 gal	0	Air	
5/30/91	N	N	Toluene Diisocyanate	Adhesives	< 1 lb	_	Land	Contaminated Area Cleaned Up
4/21/91	N/A	N	Butane	EPO	10 lb	0	Air	Shut Down System, Conservation Vent repaired
4/17/91	N/A	N	Butane	EPO	50 lb	0	Air	Shut Down System, Tank Level Transmitter Replaced
4/3/91	N	N	Acrylonitrile & Styrene	Research Services	< 6 lb	0	Air	Contaminated Area Cleaned Up, Correct Valve Position Reviewed

TABLE 2-4 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
2/2/91	N/A	N	Polyol	Polyols	18,000 lb	18,000 lb	Land	Contaminated Area Cleaned Up, Cause - Camlock Fitting Failure
1/18/91	N/A	N	Heptane	Vitamins	50 lb	0	POTW	Investigated Cause
1/17/91	N/A	N	Gasoline	Vitamins	2 lb	1 lb	Air	Cleaned Up Contaminated Area, Cause - Automobile Leak
12/17/90	N/A	N	Vitamin E	Vitamins	190 lb	0	POTW	
11/1/90	N	N	Acrylonitrile	Research Services	5 g	0	Air	
6/26/90	N	N	Acrylonitrile	Polyols	1 oz	0	Air	Isolated Leak, Sight Glass Replaced
6/7/90	N/A	N	Butane	EPO	20 lb	0	Air	Closed Valve, Valve Position Labeled
6/6/90	N/A	N	Butane	EPO	≈ 20 lb	0	Air	Closed Valve, Valve Position Labeled
6/1/90	N/A	N	Thionyl Chloride	Research Services	0.7 lb	0	Air	Stopped Leak, Cleaned Up Area, Cause - Drum Seam Leak
5/25/90	N/A	N	Butane	EPO	40 lb	0	Air	Shutdown System, Replaced rupture Disc
5/9/90	N	N	Ethylene Oxide	Polyols	< 1 lb	0	Air	Valve Closed, Re-built Safety Relief Valve
4/23/90	N	N	Hydrochloric Acid (32%)	Vitamins	1,200 lb	1,195 lb	Air	Closed Valve, Neutralized w/i Dike

TABLE 2-4 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
3/27/90	N	N	Hydrogen Chloride (Anhydrous)	Vitamins	1 lb	0	Air	Shut Down System, Repaired Piping
3/9/90	N/A	N	Butane	EPO	130 lb	0	Air	Shut Down System
12/19/89	N	N	Acrylonitrile / Styrene	Research Services	0.21 lb	0	Air	Cleaned Up Area, Repaired Fitting
12/19/89	N	N	Hydrogen Chloride & Heptane	Vitamins	< 105 lb	0	Air	Shut Down System, Replaced Rupture Disc
12/14/89	N	N	Hydrogen Chloride & Heptane	Vitamins	< 105 lb	0	Air	Shut Down System, Replaced Rupture Disc
12/12/89	N	N	Hydrogen Chloride & Heptane	Vitamins	< 105 lb	0	Air	Shut Down System, Replaced Rupture Disc
11/25/89	N	N	Propylene Oxide	Polyols	< 1 oz	0	Air	Closed Valve
11/9/89	N/A	N	N-Dodecylmercaptan	Polyols	< 10 gal	-	Land	Cleaned Up Area
11/1/89	N	N	Ethylene Oxide	Polyols	< 1 lb	0	Air	Shut Down System, Re-tightened Fitting
9/5/89	N	N	Carbon Disulfide	Bldg. 53M	1 qt	0	Air	Cleaned Up Area
8/4/89	N	N	Zinc Hydroxide	Vitamins	20 kg	0	POTW	Shut Down System, Replaced Filter Paper

TABLE 2-4 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
7/24/89	N	N	Hydrogen Chloride (Anhydrous)	Vitamins	< 4 lb	0	Air	Shut Down System, Replaced Gasket
7/20/89	N	N	Hydrogen Chloride (Anhydrous)	Vitamins	< 4 lb	0	Air	Shut Down System, Replaced Gasket
5/22/89	N	N	Acrylonitrile	Polyols	<50 lb	-	Air/Land	Neutralized Spill, Replaced Pipeline
12/2/88	N	N	Vacuum Pump Oil	Polyols	3 gal	3 gal	Land	Contaminated Material Removed, Reconfigured Valve & Flange
10/6/88	N	N	Sulfuric Acid (93%)	Steam Facility	360 lb	0	Water	Stopped Leak, Neutralized
7/18/88	N	N	Vacuum Pump Oil	Bldg. 53 M	25 gal	-	Land	Cleaned Up Area, Inhibitor Addition Procedures Implemented
6/7/88	N	N	Acetaldehyde	Chemical Engineering	10 lb	-	Air	Cleaned Up Area, Transferred Contents of Container
7/2/87	N	N	Zinc Chloride (2.5%)	Vitamins	30 gal	0	POTW	Stopped Leak
12/18/86	N	N	Propylene Oxide	Polyols	< 5 lb	0	Air	Shut Down System
10/20/86	N	N	Potassium Hydroxide (45%)	Polyols	250 gal	0	Water	Neutralized
6/23/86	N	N	Propylene Oxide	Polyols	1 gal	0	Air	Depressurized

TABLE 2-4 (Continued)
BASF CORPORATION, WYANDOTTE SITE
SUMMARY OF SPILLS/RELEASES TO THE ENVIRONMENT[1]

DATES	EXCEED RQ (Y/N)	REPORTED (Y/N)	MATERIAL SPILLED	LOCATION WHERE SPILLED	QUANTITY RELEASED [2]	QUANTITY RECOVERED [2]	MEDIA IMPACTED	DESCRIPTION OF THE MITIGATING RESPONSE ACTIONS
5/5/82	N	N	Phosphoric Acid (85%)	Chemical Engineering	45 gal	0	Water	Stopped Leak, replaced Sample Line
12/15/78			Hydrogen Chloride & Heptane	Vitamins	< 105 lb	0	Air	Shut Down System
2/12/75			Polyol		1,700 gal			
2/8/75			Polyol					
7/79			Polyol	Polyols	?		Water	
5/78			Toluenediamine	Polyols	?			
3/80			Phosphoric Acid	Polyols	10,000 lb			
2/78			Polyol	Polyols	5,000 gal		Water	
??/85			Acrylonitrile	Polyols	?			

Note:

1 This table represents spills/releases that potentially were released to the environment. This does not include spills/releases of materials which occurred within a containment area or building and where mitigated without impact to the environment.

2 Units of Measure:
g - gram gal - gallon
kg - kilogram lb - pound oz - ounce

TABLE 6-1

TYPES OF REGULATED WASTES MANAGED AT SWMU A

Waste Code	Description of Waste
D001	Ignitable
D002	Corrosive
D003	Reactive
F001	Spent Halogenated Solvents Used For Degreasing Operations
F002	Spent Halogenated Solvents
F003	Spent Ignitable Non-Halogenated Solvents
F005	Spent Toxic Non-Halogenated Solvents
U009	Acrylonitrile
U037	Chlorobenzene
U044	Chloroform
U121	Trichlorofloromethane
U210	Carbon Tetrachloride
U221	Toluenediamine
U223	Toluene Diisocyanate
019L	Coolants/Water Soluble Oil
020L	Lubricating Oil
021L	Other Oil
025L	Mixed Oil Residue
029L	Other Liquid Waste
123U	Methanoic (Formic) Acid
131U	Styrene

(Fred C. Hart Associates, Inc., November 8, 1988)

TABLE 7-1

TYPES OF REGULATED WASTES MANAGED AT SWMU B

Waste Code	Description of Waste
D001	Ignitable
D003	Reactive
D009	Mercury
D011	Silver
D018	Benzene
D019	Carbon Tetrachloride
F002	Spent Halogenated Solvents
F003	Spent Ignitable Non-Halogenated Solvents
F005	Spent Toxic Non-Halogenated Solvents
U223	Toluene Diisocyanate
131U	Styrene
029L	Other Liquid Waste

TABLE 8-1

TYPES OF REGULATED WASTES MANAGED AT SWMU C

Waste Code	Description of Waste
D001	Ignitable
D002	Corrosive
D003	Reactive
D007	Chromium
D009	Mercury
D011	Silver
D018	Benzene
D019	Carbon Tetrachloride
F002	Spent Halogenated Solvents
F003	Spent Ignitable Non-Halogenated Solvents
F005	Spent Toxic Non-Halogenated Solvents
P005	Allyl Alcohol
P018	Brucine
P022	Carbon Disulfide
P039	Disulfoton
P106	Sodium Cyanide
U001	Acetaldehyde
U007	Acrylamide
U009	Acrylonitrile
U028	Diethlyhexylphthalate
U080	Methylene Chloride
U147	Maleic Anhydride
U154	Methanol
U220	Toluene
U221	Toluenediamine
U223	Toluene Diisocyanate
021L	Other Oil
029L	Other Liquid Waste
131U	Styrene

Techna 1993

TABLE 10-2

RAW MATERIALS AND PRODUCTS THAT MAY HAVE BEEN DEPOSITED IN THE POLYOLS POND ROUTINELY

Raw Materials and Products	CAS No.	Present Since 1989?	Comment
2-ethylhexanoic acid	149-57-5	Y	
acrylonitrile	107-13-1	Y	
amine catalysts	-	Y	includes TBA, TEA and TEOA
bisphenol A	80-05-7	Y	
calcium naphthenate	61789-36-4	Y	
carbon black	1333-86-4	Y	
chlorine	7782-50-5	N	
colorants besides carbon black	-	N	
dimethylformamide	68-12-2	Y	
dimethyldiethylsuccinonitrile		Y	
ethoxylated fatty acids	-	N	
ethylene oxide	75-21-8	Y	
ethylene diamine	107-15-3	Y	
freons	-	N	ceased ~1980
glycerine	56-81-5	Y	
glycols (ethylene- and propylene-, both mono- and di-)	-	Y	
hexane	110-54-3	N	
magnesium silicate	14807-96-6	Y	
maleic anhydride	108-31-6	Y	
monoethanolamine	141-43-5	Y	
nitric acid	7697-37-2	Y	

TABLE 10-2 (Continued)
RAW MATERIALS AND PRODUCTS THAT MAY HAVE BEEN DEPOSITED IN THE POLYOLS POND ROUTINELY

Raw Materials and Products	CAS No.	Present Since 1989?	Comment
pentaerythritol	115-77-5	Y	
phosphoric acid	7664-38-2	Y	
polychlorinated phenol		N	ceased in 1978
polyols	25322-69-4	Y	
potassium hydroxide	1310-58-3	Y	
propylene oxide	75-56-9	Y	
sodium hydroxide	1310-73-2	Y	
styrene	100-42-5	Y	
sucrose	57-50-1	Y	
sulfuric acid	7664-93-9	Y	
tetramethylhydroquinone		Y	
tetramethylsuccinonitrile	3333-52-6	N	ceased 1982
tin octoate catalysts		Y	
toluene	108-88-3	Y	
toluene diamine	25376-45-8	Y	
trimethylolpropane	77-99-6	Y	
polypropylene glycol		Y	
water additives by Betz	-	Y	approved for use by MDNR

TABLE 10-3

OTHER MATERIALS CURRENTLY USED AT POLYOLS PLANT

Raw Material and Products	CAS No.
1-Butanol	71-36-3
2-Butanol	78-92-2
AGE	106-92-3
Ammonia	7664-41-7
Benzoyl Chloride	98-88-4
Diethanolamine	111-42-2
Dipropylene Glycol	25265-71-8
Filter Aid	68855-54-9
Hydrogen Peroxide, Conc < 52%	7722-84-1
Methanol	67-56-1
N-Dodecyl Mercaptan	112-55-0
Naugard 445	10081-67-1
Naugard BHT, C.P.	128-37-0
Phenothiazine	92-84-2
Polycat 77	3855-32-1
Quadrol	102-80-3
RMS 35-21 TLD	25550-98-5
Tetramethylxylene, iso	2094-99-7
Toluene Diisocyanate (mixed)	26471-62-5
Proprietary Catalyst	

TABLE 14-1
HAZARDOUS WASTES OR HAZARDOUS WASTE CONSTITUENTS IDENTIFIED AT AOC 1

Description	Maximum Concentrations		
	Groundwater (mg/l) GTI 1992	Soil (mg/kg) GTI 1992	Soil Gas (ppm) ERM, 1990
Benzene	9.1	1,070	70
Toluene	15.0	493	55
Ethylbenzene	6.0	377	3
Xylenes	0.49	549	3
Styrene	58.6	121	300
Vinyl chloride	<0.0025	0.089	300

TABLE 15-1

TYPICAL COAL TAR CHEMICAL CONSTITUENTS

INORGANICS	METALS	VOLATILE AROMATICS	PHENOLICS	POLYNUCLEAR AROMATIC HYDROCARBONS
Ammonia (1)	Aluminum (1)	Benzene	Phenol	Acenaphthene
Cyanide	Antimony	Ethylbenzene	2-Methylphenol	Acenaphthylene
Nitrate (1)	Arsenic	Toluene	4-Methylphenol	Anthracene
Sulfate (1)	Barium	Total Xylenes	2,4,-Dimethylphenol	Benzo(a)anthracene
Sulfide	Cadmium			Benzo(a)pyrene
Thiocyanate (1)	Chromium			Benzo(b)fluoranthene
	Copper			Benzo(g,h,i)perylene
	Iron (1)			Benzo(k)fluoranthene
	Lead			Chrysene
	Manganese (1)			Dibenzo(a,h)anthracene
	Mercury			Dibenzofuran
	Nickel			Fluoranthene
	Selenium			Fluorene
	Silver			Naphthalene
	Vanadium			Phenanthrene
	Zinc			Pyrene
				2-Methylnaphthalene
				Indeno(1,2,3-cd)pyrene

(1) These parameters are not listed at 40 CFR 264 Appendix IX, and samples will not be analyzed for these parameters.

TABLE 16-1
HAZARDOUS WASTE CONSTITUENTS IDENTIFIED AT AOC 3

Description	Chemical CASRN	Concentration (ppb)
Benzene	71-43-2	8100
Chlorobenzene	108-90-7	53000
Trichloroethane	79-00-5	2000
Vinyl Chloride	75-01-4	5200

(Ref: Analytical Report 1992, Appendix I, Exhibit 1)

TABLE 19-1
HAZARDOUS WASTE CONSTITUENTS
IDENTIFIED AT AOC 6

Description	Chemical CASN	Concentration * (mg/l)
Barium	7740-39-3	0.17
Benzene	71-43-2	731
Lead	7439-92-1	0.6

* TCLP Recovery Corrected

(Ref: Analytical Report, 1992, see Appendix K.)

TABLE 20-1

1994 BASF SPLIT SAMPLE RESULTS FOR VICINITY OF AOC 7

Inorganic Results

Compound	BASF - 1	BASF - 2	BASF - 3A	BASF - 3B	BASF - 4
Arsenic	10	8.2	36	2.4	13
Barium	54	106	79	15	76
Cadmium	3.0	6.9	6.2	ND (< 0.6)	3.0
Chromium	25	88	28	6.9	24
Copper	24	22	38	33	52
Mercury	1.2	2.1	72	0.08	0.47
Lead	83	77	560	12	25
Zinc	77	99	340	21	57
pH	7.52	7.72	7.25	7.69	6.84
Total Cyanide	17	14	140	61	85

Notes:

1 All concentrations in units of mg/kg with exception to pH.
2 Analyses by BASF research services.
3 ND = not detected
4 Sampling performed by EPA personnel. Exact sampling locations are not currently known.

TABLE 20-1 (Continued)

1994 BASF SPLIT SAMPLE RESULTS FOR VICINITY OF AOC 7

Organics Results

Compound	BASF - 1	BASF - 2	BASF - 3A	BASF - 3B	BASF - 4
Naphthalene	ND (< 1)	ND (< 1)	2.6	ND (< 1)	ND (< 4)
Phenanthrene	1.6	1.5	3.3	ND (< 1)	ND (< 4)
Fluoranthene	1.7	ND (< 1)	2.8	ND (< 2)	12
Pyrene	1.1	ND (< 1)	1.6	ND (< 1)	7.9
Benzo(a)anthracene	1.7	ND (< 1)	1.8	ND (< 1)	5.6
Chrysene	1.7	ND (< 1)	2.3	ND (< 1)	5.0
Benzo(b)fluoranthene	3.9	ND (< 1)	11	ND (< 1)	10
Benzo(k)fluoranthene	2.8	ND (< 1)	6.2	ND (< 1)	9.0
Benzo(a)pyrene	2.4	ND (< 1)	7.1	ND (< 1)	ND (< 4)
Benzo(g,h,i)perylene	3.6	ND (< 1)	8.2	ND (< 1)	ND (< 4)

Notes:

1 All concentrations in units of mg/kg with exception to pH.
2 Analyses by BASF research services.
3 ND = not detected
4 Sampling performed by EPA personnel. Exact sampling locations are not currently known.

TABLE 20-2

1994 EPA SAMPLE RESULTS FROM VICINITY OF AOC 7

Inorganic Results

Compound	BASF - 1	BASF - 2	BASF - 3A	BASF - 3B	BASF - 4
Arsenic	14.4	3.8	20.5	2.2	21.2
Barium	41.2	89.9	62.6	20.9	46.7
Cadmium	1.4	7.5	2.1	ND (<1.3)	ND (<1.3)
Chromium	23.5	92.7	21.6	7.7	21
Copper	291	27.9	ND (<5.0)	ND (<5.1)	114
Iron	41,300	34,600	42,400	11,100	21,900
Mercury	1.6	1.2	44.5	0.17	0.41
Lead	127	111	873	33.7	72.3
Selenium	ND (<1.2)	ND (<1.2)	ND (<1.1)	ND (<1.2)	ND (<1.4)
Silver	ND (<2.6)	ND (<2.3)	ND (<2.5)	ND (<2.6)	ND (<2.6)
Zinc	81.5	114	241	19.6	33.5
pH	7.6	8.2	7.5	8.4	7.1
Total Cyanide	448	431	5,340	613	1,610
WAD CN	18.2	26.2	683	25.1	37.6

Notes:

1 All concentrations in units of mg/kg with exception to pH.
2 ND = not detected
3 Sampling performed by EPA personnel.

TABLE 20-2 (Continued)

1994 EPA SAMPLE RESULTS FROM VICINITY OF AOC 7

Organics Results

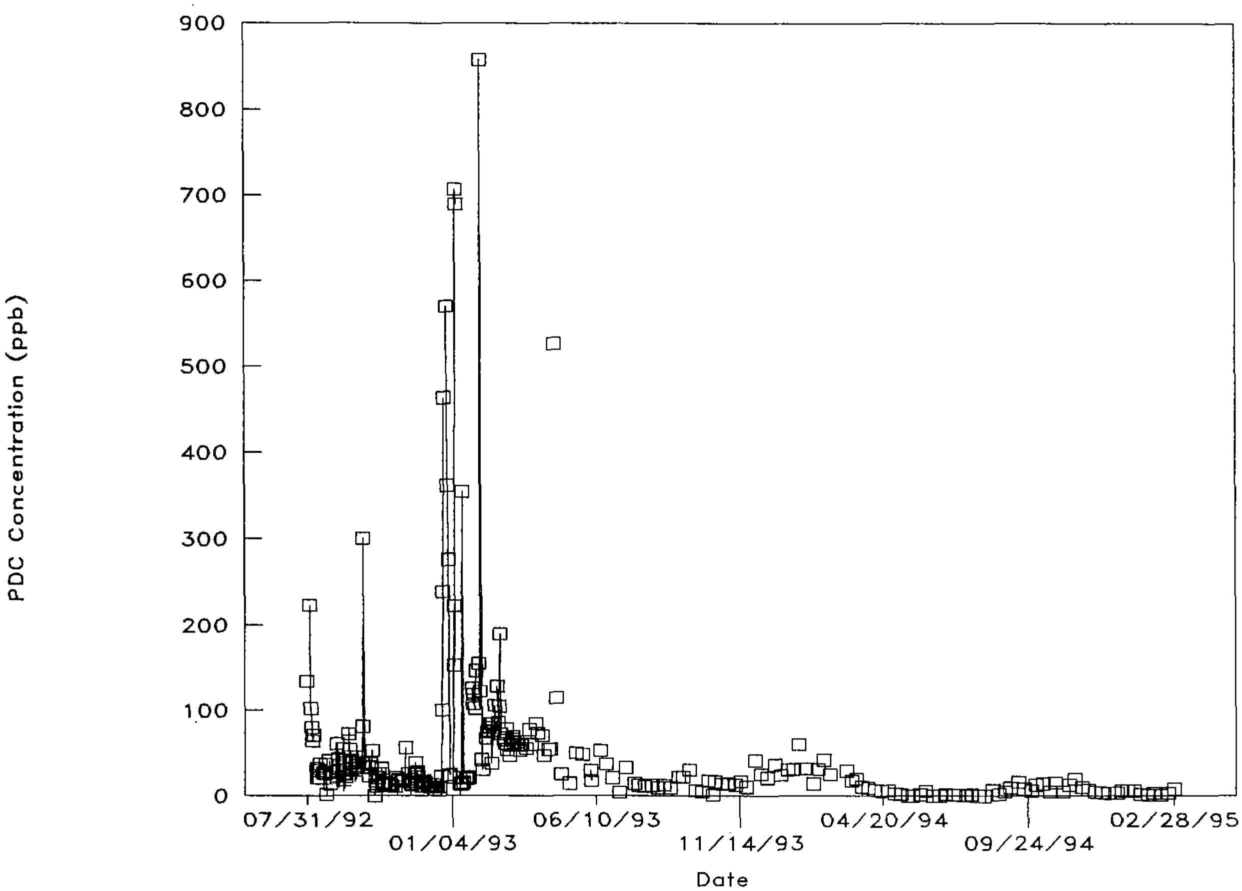
Compound	BASF - 1	BASF - 2	BASF - 3A	BASF - 3B	BASF - 4
Naphthalene	0.13(J)	0.14(J)	0.33(J)	1.3	0.47
Phenanthrene	0.14(J)	0.21(J)	0.25(J)	0.067(J)	0.34(J)
Fluoranthene	0.31(J)	0.26(J)	0.61	0.12(J)	6.5(E)
Pyrene	0.38(J)	0.25(J)	0.45	0.29(J)	5.9(E)
Benzo(a)anthracene	0.65	0.24(J)	0.64	0.17(J)	3.2
Chrysene	0.82	0.30(J)	1.2	0.22(J)	4.1(E)
Benzo(b)fluoranthene	1.7	0.55	5.0(E)	0.26(J)	4.1(E)
Benzo(k)fluoranthene	ND(<0.43)	ND(0.4)	ND(<0.41)	ND(<0.43)	ND(<0.46)
Benzo(a)pyrene	0.82	0.21(J)	2.5	ND(<0.43)	1.5
Benzo(g,h,i)perylene	1.1	0.41	2.4	ND(<0.43)	1.0

Notes:

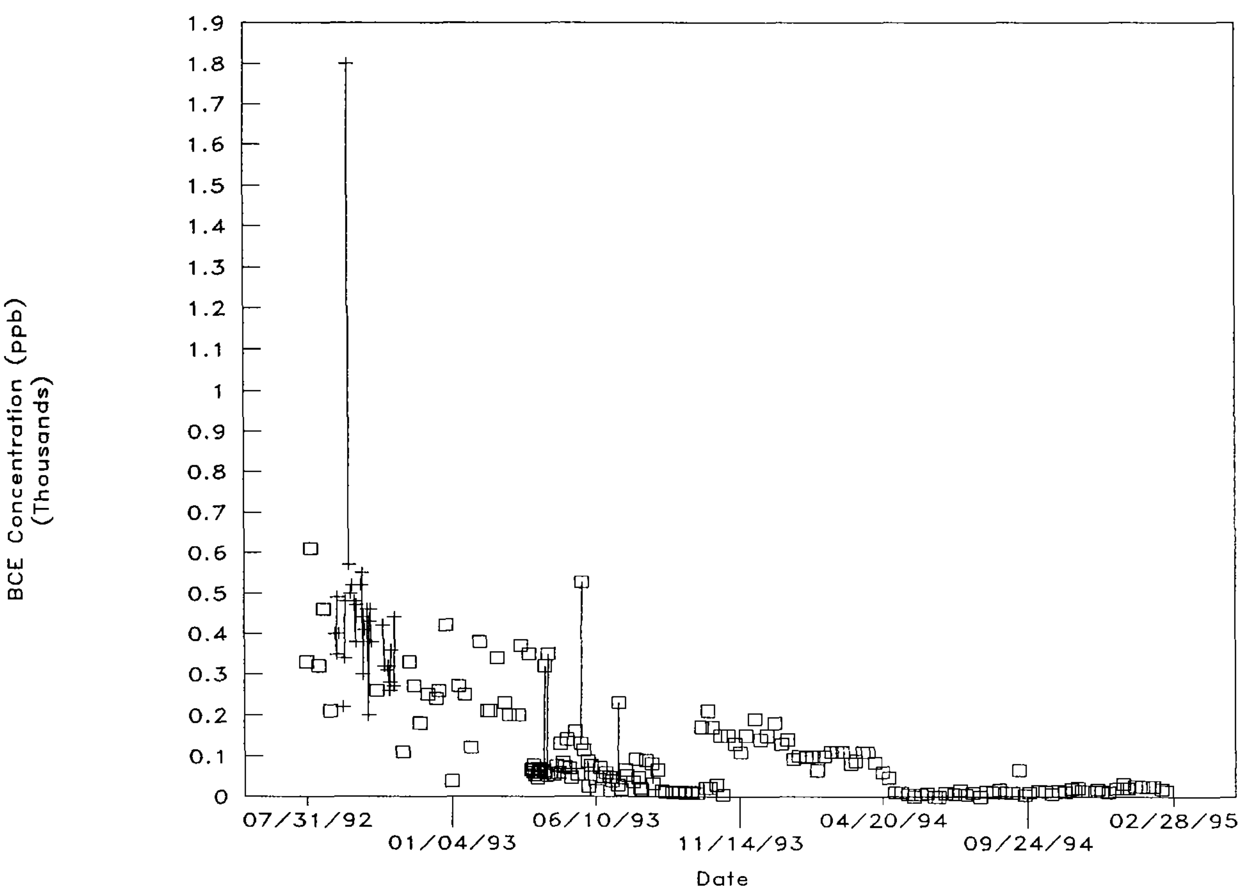
1 All concentrations in units of mg/kg.
2 ND = not detected
3 Sampling performed by EPA personnel.

APPENDIX F

EXHIBIT 7



900
800
700
600
500
400
300
200
100
0
PDC Concentration (ppb)
07/31/92
01/04/93
06/10/93
11/14/93
04/20/94
09/24/94
02/28/95
Date



1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
BCE Concentration (ppb)
(Thousands)
07/31/92
01/04/93
06/10/93
11/14/93
04/20/94
09/24/94
02/28/95
Date

APPENDIX A

EXHIBIT 1

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

ENVIRONMENTAL AFFAIRS

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

GORDON E. GUYER, Director

1988 MAR -1 P 12: 2

EMERGENCY RESPONSE

February 26, 1988

CERTIFIED MAIL

Mr. Keith Fry, Director
Corporate Environmental Protection
BASF Wyandotte Corporation - Wyandotte
1809 Biddle Avenue
Wyandotte, Michigan 48092

Dear Mr. Fry:

SUBJECT: BASF Wyandotte Corporation - Wyandotte
Act 64 Operating License Application
MID 064 197 742

In 1984, the Federal Resource Conservation and Recovery Act (RCRA) was amended by the Hazardous and Solid Waste Amendments (HSWA) to require a final decision on all permit applications for hazardous waste storage facilities by November 8, 1992. In order to meet the HSWA permit issuance deadline, the Michigan Department of Natural Resources is hereby formally calling in the Act 64 (1979 PA 64, as amended) operating license application for your hazardous waste treatment and storage units located at ~~1809~~ 1609 Biddle Avenue, Wyandotte, Michigan. This call-in is being made pursuant to MAC R 299.9502. As specified in R 299.9502(3)(b), an owner or operator of a storage facility must submit a complete operating license application within 120 days of being requested to do so. As an agent for the U.S. Environmental Protection Agency, the Department is also calling in the HSWA portion of your permit application pursuant to Section 3004(u) of RCRA. The operating license will have a federally issued portion and a state issued portion. This dual permitting results because Michigan has not yet received final authorization for all portions of HSWA.

If you do not intend to continue to operate the facility, you may submit a closure plan in lieu of the requested operating license application. The closure plan must meet the requirements of 40 CFR 264 Subpart G, in accordance with and as adopted by reference in R 299.9601(3) and (8). If you desire to pursue this option, you must submit a complete closure plan no later than June 28, 1988.

The following comments will assist you in satisfying this request:

1. If you intend to submit an operating license application, an application form and a detailed instruction package are enclosed for your use. Instructions for preparing a closure plan may be obtained by calling the Hazardous Waste Permits Unit at 517-373-2730.

Portions of the application will be extracted and made enforceable provisions of your license. As such, they must be submitted as complete, free standing documents to allow easy attachment to the license. Each item should be precisely written with specific schedules and commitments. Generalities and discretionary language should be avoided whenever possible. The following items are the primary attachments to the Act 64 license:

a. Waste analysis plan;
b. Inspection schedule;
c. Personnel training program;
d. Contingency plan;
e. Closure and post-closure plan (including cost estimates);
f. Facility plans and specifications;
g. Procedures for all environmental monitoring carried out at the facility.

2. If applicable, the operating license application must include a corrective action program to achieve compliance with Section 3004(u) of RCRA. The RCRA portion of a hazardous waste permit (that portion addressing HSWA requirements) cannot be issued until the requirements of Section 3004(u) are met. Section 3004(u) requires "corrective action for all releases of hazardous waste or constituents from any solid waste management unit at a treatment, storage or disposal facility seeking a permit under this subtitle." The provisions of HSWA require that decisions on permit applications be made on a rigid time schedule.

Please submit ten copies of your Act 64 operating license application by June 28, 1988. If you desire to close the facility in lieu of obtaining a permit, please submit a complete closure plan by the date specified previously. The Department recommends that you contact the Hazardous Waste Permits Unit as soon as possible to discuss the requirements outlined in this letter. Failure to submit the requested information within the time period indicated may result in the denial of your applications under Act 64 and RCRA.

Information obtained by the Department through an operating license application is routinely treated as a public record, as provided in the Freedom of Information Act, 1976 PA 442. A record, permit application, or other information, or a portion of a record, permit application, or other information furnished to or obtained by the Department or its agents under Act 64, may be designated confidential, for use only by the Department. If this option is pursued, however, detailed justification for the confidentiality request must be submitted with the Act 64 application. Please submit all confidential material in a sealed envelope marked "confidential material enclosed" and indicate same in your transmittal letter.

If you have questions, please contact the Hazardous Waste Permits Unit, Waste Management Division, at 517-373-2730.

Sincerely,

Gordon E. Guyer
Director
517-373-2329

cc: Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Alan Howard, DNR
Mr. John Bohunsky, DNR/District DNR
Mr. Ken Burda, DNR/Operating License File

APPENDIX A

EXHIBIT 2

DOCUMENTATION OF CLOSURE
CONTAINER STORAGE AREA

BASF CORPORATION - CHEMICALS DIVISION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

NOVEMBER 8, 1988

TABLE OF CONTENTS

NOVEMBER 8, 1988

I. SITE IDENTIFICATION

BASF Corporation, Chemicals Division
Wyandotte, Michigan Facility
1609 Biddle Avenue
Wyandotte, MI 48192
(313) 246-6106

EPA ID Number: MID 064197742
Generator/Storage Facility

General Manager of Facility:	C.W. Axce
Quality & Ecology Services Manager:	H. Dale Roush

II. INTRODUCTION

This document is intended to provide the necessary certification to the Michigan Department of Natural Resources - Waste Management Division (MDNR-WMD) to allow withdrawal of Interim Status for on-site storage of hazardous waste materials in excess of 90 days at the North Works of BASF Corporation, Chemicals Division (BASF) in Wyandotte, Michigan. BASF has previously provided MDNR-WMD with letters/affidavit statements to withdraw all items from their respective Part A application except for an outdoor hazardous waste container storage area. BASF considers this storage area closed (i.e., no longer active) and this document is being submitted to the MDNR-WMD to provide a chronicle of facts surrounding the subject storage area. The document will demonstrate that BASF is fully compliant with 40 CFR 265, Subpart G.

Although it was not practical for BASF to perform a "clean closure" of the subject container storage area, a post-closure plan was not developed for inclusion in this document. However, as mandated by state and Federal regulations, BASF is providing and will continue to provide the necessary care to insure that public health, welfare, and the environment are not endangered in any manner from the former hazardous waste storage area. BASF is approximately two years into implementation of a 30-year site remediation program persuant to a Consent Decree entered into the records of the U.S. District Court for the Eastern District of Michigan, Southern Division on November 12, 1985. This remediation program was designed to control conditions at the North Works site which could endanger public health, welfare, or the environment and take measures to prevent the flow of any contaminated groundwaters from the site to the Detroit River. Subsequent sections of this document discuss the details and requirements of the aforementioned Consent Decree.

Affidavit statements are also included herein (signed by BASF company officials) to certify that hazardous wastes are not presently located in the storage area, the area has not been utilized for management of hazardous wastes since March of 1987, and that the area is closed (i.e., no wastes will be stored there in the future).

In summary, this document provides a written record for the MDNR-WMD that BASF will insure the following conditions are met:

- All stored hazardous wastes have been removed from the subject storage area and have been properly disposed
- The storage area will not be utilized for hazardous waste management activities in the future
- The storage area does not constitute a current or future threat to public health, welfare, or the environment

III. HISTORY OF BASF's INTERIM STATUS

BASF's North Works complex in Wyandotte, Michigan occupies approximately 230 acres adjacent to the Detroit River. The complex is utilized for the manufacture of vitamins, urethane polyols, polyurethane plastics, polyurethane castings for automotive applications, and automobile windshield adhesives/sealants. Chemical manufacturing originated on the site in 1890 by the Michigan Alkali Company. In 1969 the company (which had been re-named Wyandotte Chemical Company) was purchased by BASF Aktiengesellschaft (a German corporation) and today is known as BASF America Corporation, Chemicals Division. Corporate headquarters are located in Parsippany, New Jersey.

The Wyandotte complex is illustrated in Figure I and consists of nine (9) separate facilities as listed below:

- Polyol Plant - Manufacture of urethane polyols
- Vitamin E Plant - Production of pharmaceutical and animal feed grades of Vitamin E
- Vitamin Powder Plant - Production of dry Vitamin A and E powders
- Elastocell Plant - Manufacture of cast polyurethane moldings for automotive applications
- Thermoplastic Polyurethanes Plant - Manufacture of polyurethane plastic material for various applications
- Windshield Adhesives Plant - Production of automobile windshield adhesives and sealants
- Corporate Research & Development Laboratories
- Administrative offices
- Small boiler installation for production of steam required to support the above operations

As with most large industrial facilities, manufacturing and research activities at the BASF North Works complex generate several types of hazardous waste materials. Prior to March of 1987, BASF would store some of these hazardous wastes on-site in containers until off-site shipment became practical from an economic perspective. Normal operations were to maintain the stored wastes (on occasion for more than a 90 day period) on a concrete pad located in the approximate center of the complex.

In November of 1980, BASF submitted Part A of a Treatment, Storage, and Disposal (TSD) permit application to the Environmental Protection Agency (EPA) persuant to the newly promulgated Resource Conservation and Recovery Act (RCRA). This application was a "protective filing" from BASF's perspective. All facilities/processes within the complex that were in any way associated with hazardous waste management were included on the application. As a result, the following items were submitted to the EPA on November 18, 1980:

- o 25,300 gallon capacity outdoor container storage area
- o 100 cubic yard capacity outdoor container storage area
- o 4,000 gallon aboveground storage tank
- o 2 MGD surface impoundment

On April 8, 1981, BASF sent a letter to the EPA to amend the Part A application. Deletion of the 2 MGD surface impoundment was requested since the normal flow to the impoundment was non-hazardous wastewater. BASF had included the impoundment on the original application because an accidental spill of hazardous waste material was contained in the impoundment prior to 1980 (see letter in Appendix A dated April 8, 1981). However, upon being provided with clarification of regulatory requirments, BASF determined that it was not necessary to include the impoundment in the Part A application. On August 6, 1981, BASF recieved confirmation from Mrs. Elizabeth Utley of the EPA, Region V that reference to the surface impoundment had been deleted as requested.

At the time of the November 18, 1980 Part A submittal, BASF had an incinerator on-site for the purpose of incinerating waste organic vapors generated as a by-product of production operations at the Graft Polyol facility. BASF inadvertantly did not include this fact on the application and therefore sent a completely revised Part A application to the EPA on June 25, 1981 which included the incinerator.

BASF was granted Interim Status by the EPA on June 10, 1982 to utilize the on-site incinerator as designed and to store hazardous wastes in three (3) areas of the North Works complex:

- o Container Storage Area #1 - 25,300 gallon capacity
- o Container Storage Area #2 - 100 cubic yard capacity
- o 4,000 gallon aboveground tank

Subsequent to submitting the revised TSD Part A application to include the incinerator, BASF determined that the waste vapors to be incinerated in the unit did not fit the definition of hazardous wastes under Michigan's Public Act 64. The MDNR concurred with this interpretation in June of 1982 (refer to letter from MDNR dated June 15, 1982 in Appendix A).

In addition to the above determination which indicated that the incinerator should not be included on the Part A application, use of the unit was discontinued prior to the date of the November 19, 1980 appplication submittal. BASF added the unit to the Part A application on June 25, 1981 in the event that it was ever recommissioned. However, due to continuous operating problems, BASF made a corporate decision in 1982 to permanently dismantle the incinerator. Demolition was completed in December of 1982.

On September 5, 1984 BASF requested by letter that the EPA omit the incinerator from their Part A application since it no longer existed. Through various investigative efforts BASF has determined that this request was granted, and BASF recieved written confirmation on the matter on October 13, 1988. Appendix A contains copies of correspondence between BASF/regulatory agencies regarding the incinerator's impact on the Part A application respective to the North Works complex.

BASF has recently determined that the 100 cubic yard capacity container storage area and the 4,000 gallon tank also should not have been included on the Part A application. As with the 2 MGD surface impoundment and the incinerator, these items should be deleted from the application

The hazardous waste container storage area designated on the application as having a 100 cubic yard capacity is a 6.5 foot by 26 foot long concrete pad located on the west side of the North Works complex adjacent to a storage building near the Reasearch & Development facilities. Past/present BASF practices are to utilize this area exclusively for temporary storage of hazardous wastes generated by chemical research, engineering, and analytical activities. Typically, the materials that have been and continue to be placed in this area are waste solvents from non-specific sources ("F" wastes) and ignitable wastes ("D" wastes). Since filing the Part A application in November of 1980, BASF has never stored hazardous wastes in this area for a period of time exceeding 90 days. All wastes placed on the pad have been (and continue to be) transported off-site to an appropriately licensed disposal facility within 90 days of the date when the material first began accumulating in the area.

The 4,000 gallon tank is an in-line component of BASF's Vitamin E manufacturing process. The acetic acid that accumulates in the tank is a by-product of this process. The acid is not contaminated with residual chemical constituents (i.e., heavy metals) to the extent that it is unusable. Normal BASF practice is to sell the acetic acid to a buyer who utilizes the material "as received" during the processing of cement.

When this procedure is followed, the acetic acid does not meet the definition of "solid waste" provided in Michigan's Public Act 64 or in 40 CFR 261.2 since the material is not discarded.

Only four (4) times in the past eight (8) years has the subject tank become full of acetic acid when BASF did not have a party available to purchase the material. On these occasions the tank was completely emptied, the liquid was manifested as a hazardous waste, and transported off-site to an approved neutralization/disposal facility. BASF attests that at no time could acetic acid have accumulated in the tank for a period of time exceeding 90 days. The Vitamin E manufacturing process is a continously operated system and acetic acid is generated at a rate of approximately 185 gallons/operating day. This flow rate is sufficient to fill the 4,000 gallon tank to full capacity in approximately 22 operating days. If the tank becomes full, process operators are required to shut down the system (a condition considered highly undesirable by BASF).

Since November 1987, a one-inch diameter process waste pipe has been connected from the subject tank to a neutralization vessel. When a buyer is not available, the acetic acid is pumped to the neutralization vessel, the pH is adjusted, and the resultant solution is discharged to the sanitary sewer (with permission from the local wastewater authority). Under these conditions, the waste acid is disposed of through a industrial wastewater pretreatment process discharging to a POTW via a sanitary sewer. As such, disposal of the acid is regulated under the Clean Water Act and RCRA requirements are not applicable.

On October 11, 1988, BASF sent a letter and affidavit statements regarding the 100 cubic yard storage area and the 4,000 gallon tank to the MDNR-WMD. This correspondence requested that BASF's Part A application be amended by deleting reference to the two items described above. BASF certifies that the information conveyed in the letter and the above paragraphs is true, accurate, and complete (see letter/affidavit statements in Appendix A).

Upon deletion of the 100 cubic yard storage area and the 4,000 gallon tank from BASF's Part A application forms, the only hazardous waste management unit at the site is the 25,300 gallon capacity container storage area (i.e., Storage Area #1).

IV. History of Storage Area #1

In May of 1978, BASF constructed a 100 foot by 178 foot long concrete pad slightly northeast of where the Corporate Research & Development facilities are located (refer to Figure I). This pad was designed for outdoor storage of various materials. Until March of 1987, BASF utilized the southwest portion of the pad for storage of fifty-five gallon drums of hazardous waste. Drums of hazardous wastes were occasionally stored in this area for periods of time that exceeded 90 days, however, no spills or leaks were ever documented as occurring on the concrete pad.

NOTE: Since March 25, 1987, BASF has not stored hazardous waste material on-site at the North Works complex for more than 90 days. Present BASF policy is to place containers of hazardous wastes generated on-site in a warehouse located next to Alkali Street (south of Storage Area #1). This area complies with requirements for less than 90 day storage of hazardous waste specified in 40 CFR 262.34 and R299.9306 of Michigan's Act 64.

The portion of the concrete pad designated as Storage Area #1 is approximately 75 foot by 75 foot long and is enclosed on three sides by 6 inch high x 4 inch wide concrete curbing. A 3 foot by 3 foot by 2 foot deep sump is located at the west side of the storage area for collection of rainwater runoff or any potential spills from within the area.

The maximum theoretical number of drums that could be maintained in the subject storage area is approximately 460 (this subject is addressed in more detail in Section VI, Item 2). Numerous types of organic wastes were placed on the pad during the course of its active life (see Table I).

In 1981, the MDNR initiated an investigation to ascertain the presence of chemical compounds in the soil sediments, surface waters, and groundwater aquifers of the North Works complex. A confirmation was subsequently made regarding the presence of inorganic/organic compounds in soil samples and groundwater samples obtained from several locations at the site. The MDNR asserted that chemicals were leaching from site soils into site groundwaters, resulting in a threat to public health, welfare, and the environment due to chemical migration off of the North Works complex via the Detroit River.

Upon completion of the MDNR investigation, the State of Michigan initiated a complaint against BASF on October 31, 1983 in the U.S. District Court for the Eastern District of Michigan - Southern Division. Civil Action #83-CV-4712-DT asserted that since BASF owned and operated the site, BASF was responsible to reimburse the State of Michigan for expenses incurred during the site investigation, to take appropriate action to prevent further degradation of the site, and to abate any conditions which could endanger public health, welfare, or the environment due to the presence of chemical compounds in site soils and groundwaters.

TABLE 1

TYPES OF HAZARDOUS WASTES MANAGED AT STORAGE AREA #1

WASTE CODE	DESCRIPTION OF WASTE
D001	IGNITABLE WASTE
D002	CORROSIVE WASTE
D003	REACTIVE WASTE
F001	SPENT HALOGENATED SOLVENTS USED FOR DEGREASING OPERATIONS
F002	SPENT HALOGENATED SOLVENTS
F003	SPENT IGNITABLE NON-HALOGENATED SOLVENTS
F005	SPENT TOXIC NON-HALOGENATED SOLVENTS
U009	WASTE ACRYLONITRILE
U037	WASTE CLOROBENZENE
U044	WASTE CHLOROFORM
U121	WASTE TRICHLOROFLOROMETHANE
U210	WASTE CARBON TETRACHLORIDE
U221	WASTE TOLUENE DIAMINE
U223	WASTE TOLUENE DIISOCYANATE
123U	WASTE METHANOIC (FORMIC) ACID
131U	WASTE STYRENE
019L	WASTE COOLANTS/WATER SOLUBLE OILS
020L	WASTE LUBRICATING OIL
021L	OTHER WASTE OIL (MISCELLANEOUS)
025L	WASTE MIXED OIL RESIDUE
029L	OTHER LIQUID WASTE (MISCELLANEOUS)

After substantial negotiation, BASF and the State of Michigan developed and agreed to the conditions of Consent Decree #80-73699. This document was entered in the above mentioned court on November 12, 1985. The purpose of the Consent Decree was to establish that BASF would, at its own expense, prevent the flow of groundwaters from the site to the Detroit River (thereby mitigating any respective threat to public health, welfare, or the environment). Specifically, BASF was to execute the following tasks in order to comply with the requirements of the Consent Decree:

- Conduct an appropriate geotechnical study to ascertain the existing flow gradient and direction(s) of site groundwaters

- Install groundwater extraction wells/piezometers in locations identified by the geotechnical study to reverse groundwater gradients, thereby insuring that groundwaters will not leave the site via the Detroit River

- Treat all extracted groundwaters in an approved treatment system to remove specific chemical compounds (an activated carbon adsorption system was subsequently approved by applicable regulatory agencies)

- Discharge treated groundwater to the Wayne County Department of Public Works' Wastewater Treatment Plant via the public santiary sewer system in accordance with a permit specifically prepared for the circumstances (see Appendix E)

- Continue extraction/treatment of site groundwaters for a period of 30 years unless it can be demonstrated that the corrective actions instituted by BASF have reduced the concentrations of chemical compounds in groundwater aquafers to acceptable levels.

The terms of the Consent Decree further mandate that BASF will not be able to appeal any remediation requirements until January of 2002. In January of 2012 BASF is to begin collecting chemical data on the groundwater influent to the activated carbon adsorption system for the next five (5) years. The State of Michigan will regularly examine the data collected over that period. Depending upon the quality of the groundwater in 2017, BASF may be allowed to discontinue the extraction/treatment process. However, if the data indicate that significant concentrations of chemical compounds remain in the influent to the treatment system, BASF may be required to continue ground water extraction/treatment for a period of time to be determined.

V. Closure of Storage Area #1

State and Federal regulatory requirements mandate that closure of a hazardous waste storage facility must insure that soils and groundwater aquifers are left in their original condition (i.e., the state that they were in prior to conducting hazardous waste management activities at the site). Typically, this requires undertaking an extensive sampling and analytical program to determine background conditions, followed by a similar program to ascertain whether any contaminants are present at the site. If contaminants are determined to be above background conditions, clean-up activities must be conducted to remove all contaminated soils/residual materials. If all contaminants cannot be removed, a written plan outlining 30-years of post-closure care and groundwater monitoring must be developed, approved by the MDNR-WMD, and implemented.

As indicated earlier, chemical manufacturing operations have been conducted at the North Works site since the late 1800's. The historical use of the site would make it extremely difficult, if not impossible, to establish background conditions.

BASF concurs with the 1981 site investigation undertaken by the MDNR regarding the presence of chemical compounds in soils and groundwaters near the subject container storage area. Paragraphs 21-36 and Exhibit C of Civil Action #83-CV-4712-DT (see Appendix C) contain MDNR compiled data regarding concentration levels for chemical compounds in samples from specific locations of the North Works complex. Since a detailed data base regarding site conditions currently exists in MDNR files, further analysis of samples obtained from near Storage Area #1 is not necessary. The fact that chemical compounds are present in soils and groundwaters of the North Works complex is a matter of public record.

As indicated earlier in this document, Storage Area #1 is no longer active and has not been utilized for management of containers of hazardous waste since March of 1987. Appendix B contains an affidavit statement signed by representatives of BASF that the last drum of hazardous waste was removed from the storage area on March 25, 1987.

BASF believes that decontamination of the concrete pad at the subject storage area is not necessary. Residual hazardous wastes from spills or leaks are not present and the concrete pad has a clean appearance (see letter dated December 30, 1985 from Margaret Field's of MDNR in Appendix A). The types of hazardous wastes stored on the pad during the period of active use were organic solvents/ignitable liquid wastes with relatively high vapor pressures (i.e, volatile materials). In the event that any of these materials had spilled or leaked onto the pad they would no longer be present due to complete volatilization. The storage pad is exposed to the elements, causing the concrete to possess substantially elevated temperatures during summer months.

Based on the past use of Storage Area #1 as a designated hazardous waste storage area and because "clean-closure" is not possible, the area is subject to 30-years of post-closure care and groundwater monitoring per 40 CFR 265.117. However, implementation of a 30-year post-closure program for the storage area that is parallel to the 30-year remedial action program currently underway pursuant to the 1985 Consent Decree is not necessary. BASF believes that the requirements of the existing site remediation program are sufficient to satisfy the majority of the post-closure requirements outlined in 40 CFR 265.116 through 40 CFR 265.120. The terms of the Consent Decree were developed with rigorous input from various departments of the MDNR and the requirements of the document are identical (in some instances more stringent) to RCRA requirements for post-closure care and groundwater monitoring.

Any post-closure requirements mandated by 40 CFR 265, Subpart G that are not adequately addressed by the 1985 Consent Decree are discussed in Section VI.

VI. Regulatory Requirements for Closure of Storage Area #1

Due to requirements specified in the 1985 Consent Decree, BASF has taken substantial measures to insure that public health, welfare, and the environment are protected from any chemical compounds that may be at or beneath the North Works complex. These actions directly impact Storage Area #1 since the area is centrally located between groundwater extraction systems A and B (see Figures II, III, IV, and V).

This section provides documentation that BASF's closure of the subject storage area is fully compliant with the regulatory requirements for hazardous waste management units specified in 40 CFR 265 Subpart G. Applicable paragraphs of the regulation are specified below, followed by a description of the method/procedures that BASF has utilized to insure compliance with the respective requirement.

1) 40 CFR 265.112 - Steps Necessary for Closure

Storage Area #1 at BASF's North Works complex has been closed since March of 1987. There are no hazardous waste materials to remove from the storage area as the last container in the area was transported offsite for disposal on March 25, 1987 (see Appendix B).

The pad at the storage area does not require cleaning. No documented spills or leaks ever occurred in the area. The respective concrete pad is in very good condition as noted in the December 30, 1985 letter from Margaret Field's of MDNR (Appendix A). No oily residues are present and BASF believes that any organic materials that may have been inadvertantly released on the pad have completely volatilized over the past 20 month period.

2) 40 CFR 265.112(a)(2) - Estimate of Maximum Waste Inventory

Storage Area #1 is listed on BASF's Part A application as able to contain a capacity of 25,300 gallons. This corresponds to 460 fifty-five gallon containers. This figure was calculated as follows:

> Based upon the diameter of a standard fifty-five gallon drum, approximately 230 standard drums could fit in the available space of the storage area (5625 square feet). Normal drum storage practices at most industrial/warehouse facilities (including BASF) is to stack containers two (2) tiers high.

BASF attests that the subject storage area was never utilized to contain the number of containers calculated in the above paragraph. 460 drums could only fit into the available space in the subject

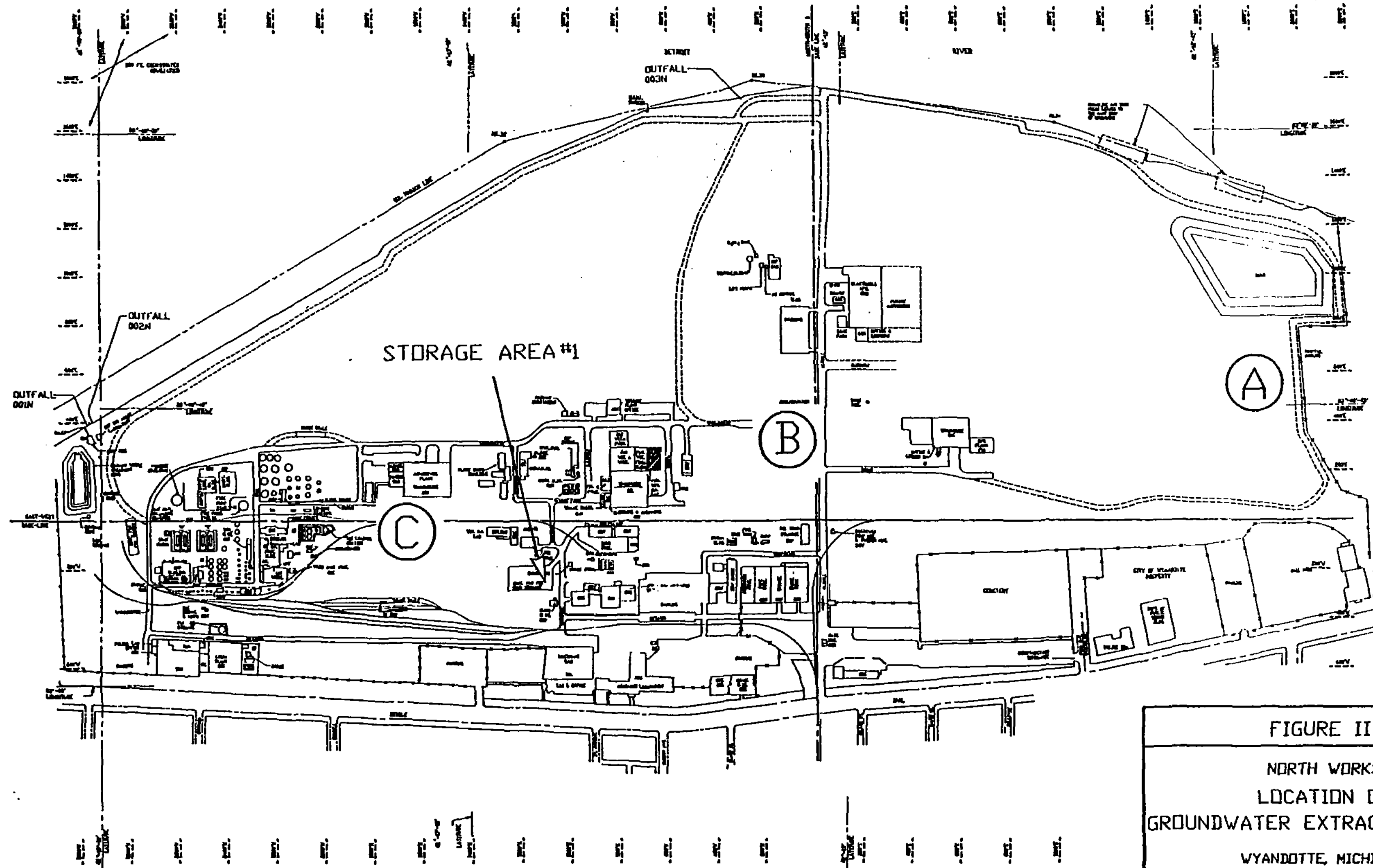


FIGURE II

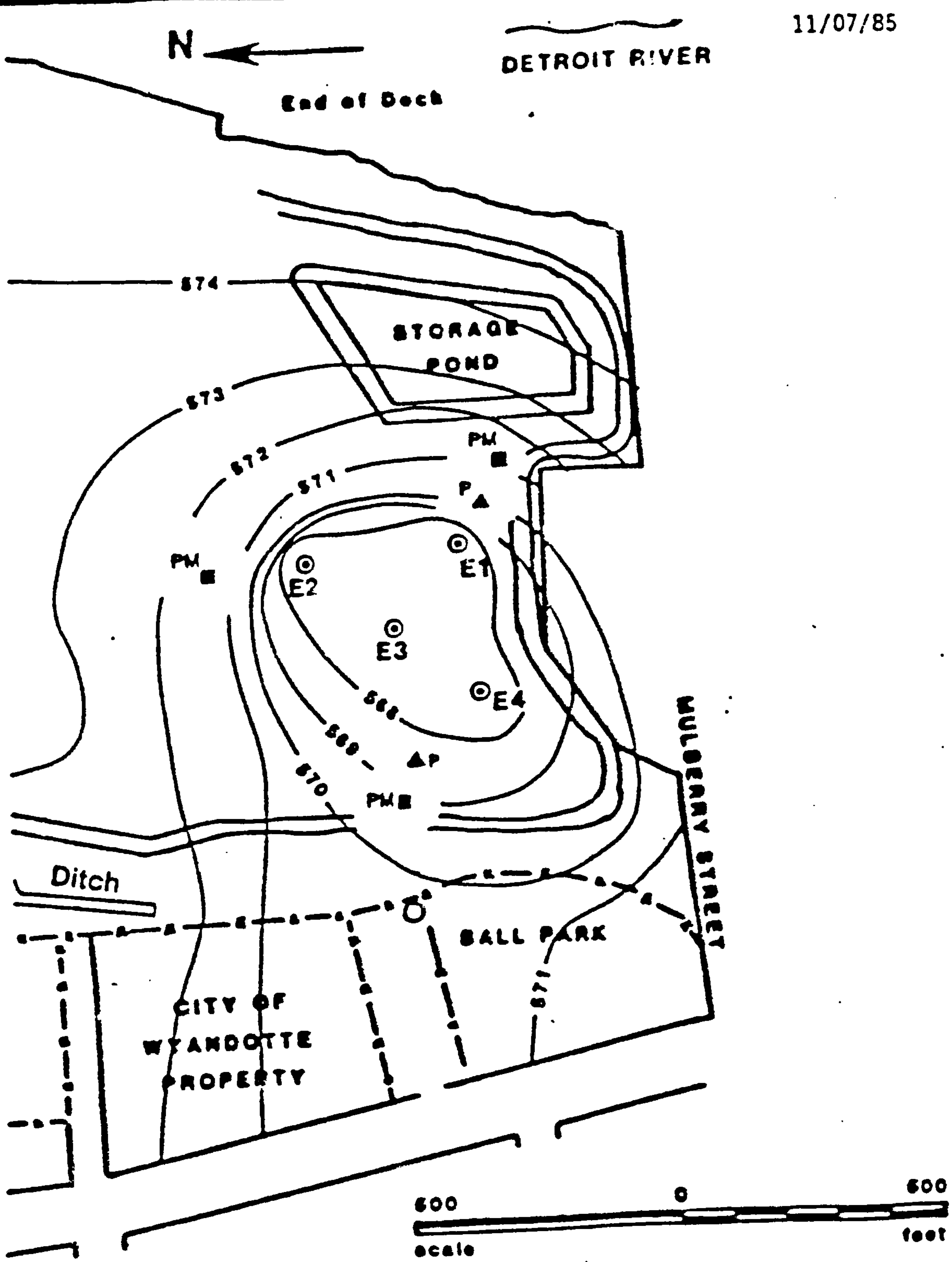
NORTH WORKS
LOCATION OF
GROUNDWATER EXTRACTION SYSTEMS

WYANDOTTE, MICHIGAN

BASF Corporation

33364

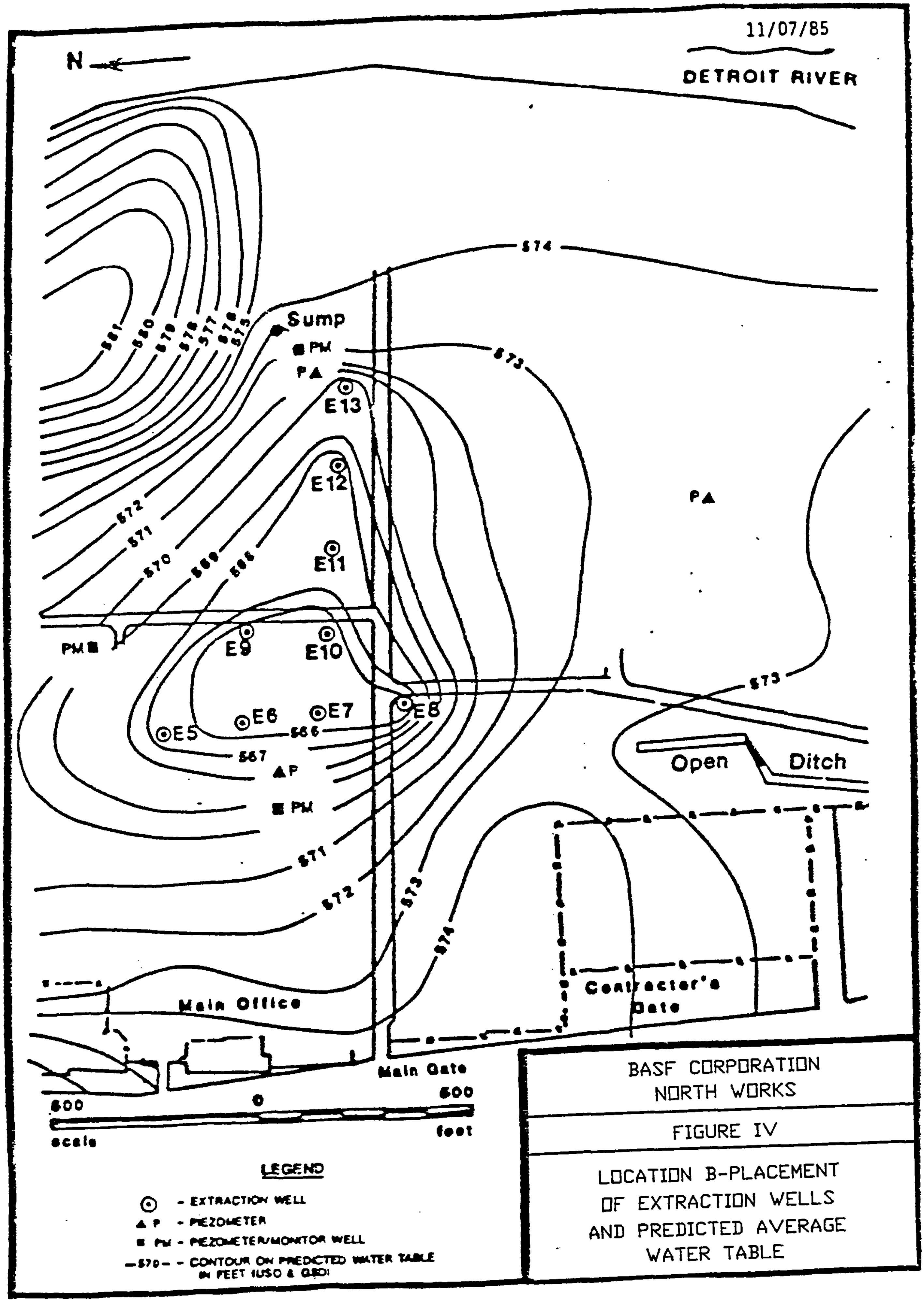
1



LEGEND

- ⊙ - EXTRACTION WELL
- ▲ P - PIEZOMETER
- ■ PM - PIEZOMETER/MONITOR WELL
- —570— - CONTOUR ON PREDICTED WATER TABLE IN FEET (USO & GSD)

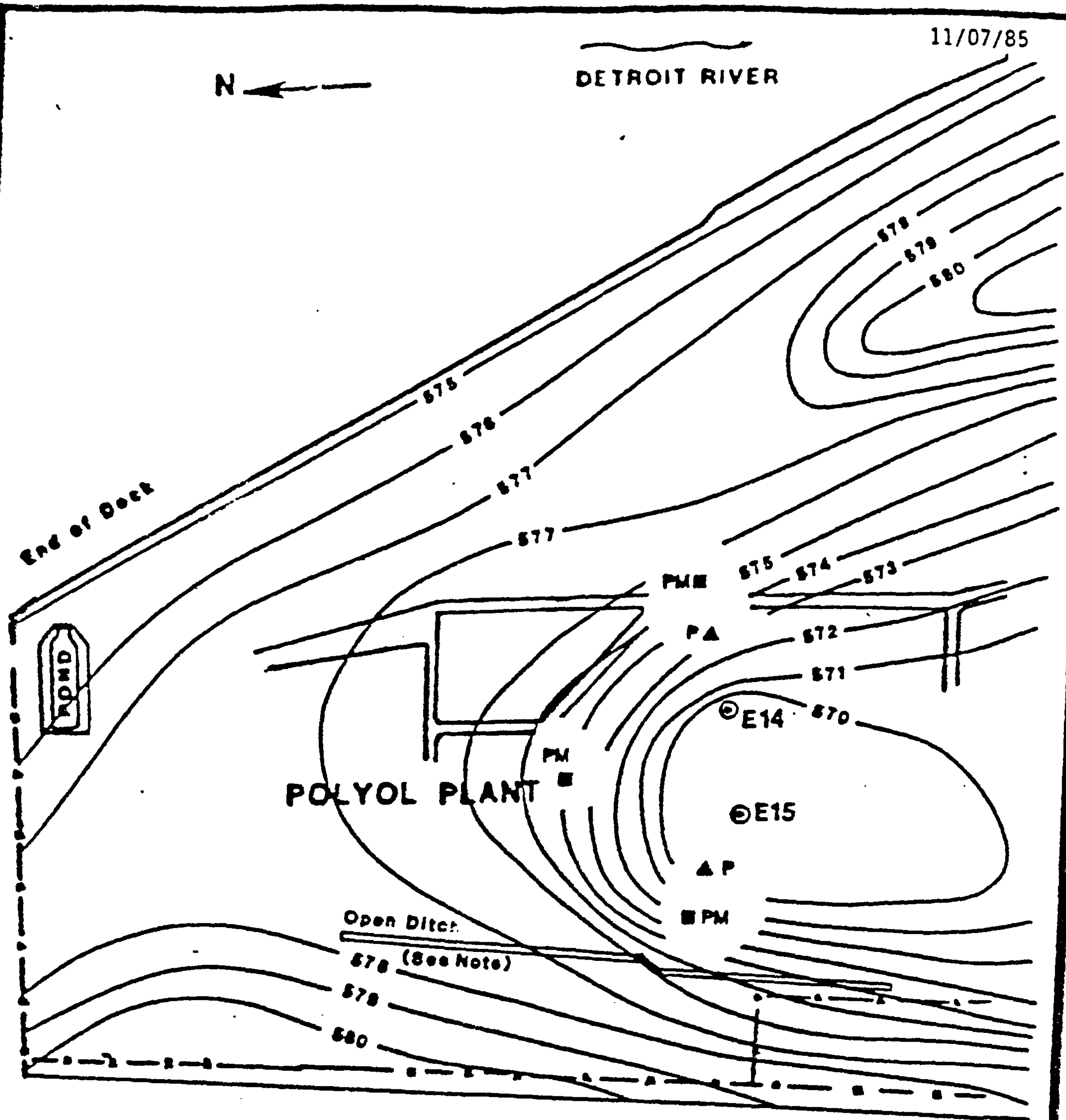
BASF CORPORATION NORTH WORKS
FIGURE III
LOCATION A-PLACEMENT OF EXTRACTION WELLS AND PREDICTED AVERAGE WATER TABLE



BASF CORPORATION
NORTH WORKS

FIGURE IV

LOCATION B-PLACEMENT OF EXTRACTION WELLS AND PREDICTED AVERAGE WATER TABLE



NOTE: Most ground-water discharge into ditch eliminated during system operation.

500 0 500
scale feet

BASF CORPORATION
NORTH WORKS

FIGURE V

LOCATION C-PLACEMENT OF EXTRACTION WELLS AND PREDICTED AVERAGE WATER TABLE

LEGEND

- ⊙ - EXTRACTION WELL
- ▲ P - PIEZOMETER
- ■ PM - PIEZOMETER/MONITOR WELL
- —570— - CONTOUR ON PREDICTED WATER TABLE IN FEET (USO & GSO)

storage area if they were placed immediately adjacent to each other. Since sufficient space was maintained on the pad to allow lift truck access, approximately 240 drums is a more accurate reflection of the maximum number of containers that could be maintained on the storage pad at any one time.

3) 40 CFR 265.112(a)(4) - Schedule for Closure

As mentioned in Item (1) above, the subject storage area has been closed since March of 1987. The last container stored in the area was shipped offsite for disposal on March 25, 1987 (see Appendix B). Development of a schedule for closure is therefore not pertinent to this document.

4) 40 CFR 265.117 - 30 Year Post-Closure Care Period

Chemical compounds are known to be present in the soils/groundwaters adjacent to the concrete pad at Storage Area #1. The area is part of the North Works complex and the 1981 MDNR investigation determined that soils at many locations of the complex contain chemical compounds. The study also concluded that groundwaters under the entire site contain measurable concentrations of various chemicals. It would not be practical for BASF to remove all soils at the storage area that contain chemical residues since it would be impossible to make a determination of where to discontinue excavation, treatment, or removal.

Because of the situation described above BASF is not able to certify "clean closure" of the subject storage area. 40 CFR 265.111 and 40 CFR 265.117 mandate that where "clean closure" is not possible, the owner/operator must take necessary precautions to protect public health, welfare, and the environment from threats due to residual materials from the former hazardous waste management facility. Typically, this requires preparation of a written post-closure plan, approval of the plan by the MDNR, and implementation of the plan for up to a 30-year period.

BASF believes that Appendix B of the 1985 Consent Decree (refer to Appendix D) meets the requirements for a written post-closure plan applicable to the North Works complex. The fact that this document was prepared with MDNR input and entered into the records of a U.S. District Court implies that the plan has been approved by the MDNR.

As mandated by the remedial action program of the Consent Decree, BASF has implemented an extensive groundwater extraction/treatment system to insure that the threats to public health, welfare, and the environment via groundwater flow from the North Works site to the Detroit River have been eliminated. The extraction system has totally reversed the natural flow of groundwater toward the river. Figure VI graphically illustrates groundwater levels at the site and the cones of depression caused by the extraction wells at Locations A, B, and C.

BASF invited Mr. Roy Schrameck (District Engineer) and Ms. Cathy Morse (Surface Water Quality Division) of the MDNR-Northville offices to visit the North Works site on March 23, 1988. Data regarding the groundwater extraction/treatment system was discussed in detail at this meeting and the MDNR representatives were satisfied with BASF's performance in complying with the requirements of the Consent Decree.

Unauthorized access to the BASF site is controlled by fences, security guards at entry gates, security guards who patrol the site after regular working hours, and the Detroit River on the west side. BASF plans to continue to conduct manufacturing operations on the site well into the future, and these security measures will remain in place throughout the duration of the 30 year Consent Decree period.

BASF regularly perfoms inspections of the groundwater extraction equipment and activated carbon adsorption system. This task is also mandated by Appendix B of the 1985 Consent Decree.

The following individual has been designated as the BASF coordinator to address all inquiries, reports, notices, or documents regarding the 1985 Consent Decree:

Mr. C.W. Axce, General Manager
BASF Corporation - Chemicals Division
1609 Biddle Avenue
Wyandotte, Michigan 48192 (313) 246-6100

BASF will maintain an copy of this Closure Document for the duration of the remedial action period. The document will be updated should any change occur which impacts the accuracy of its contents.

5) 40 CFR 265.119 - Notification of Local Land Authority

BASF will prepare a survey plat for submittal to the MDNR and the local land authority prior to January 8, 1989. This document will illustrate the location of Storage Area #1 and will list the chemical compounds found to be present at the property during the 1981 MDNR investigation. A note will be included stating that future use of the property must be compliant with the conditions of 40 CFR 265.117(c). The plat will be certified by a registered land surveyor.

NORTH WORKS GROUNDWATER LEVEL

BASF CORPORATION

WYANDOTTE, MICHIGAN

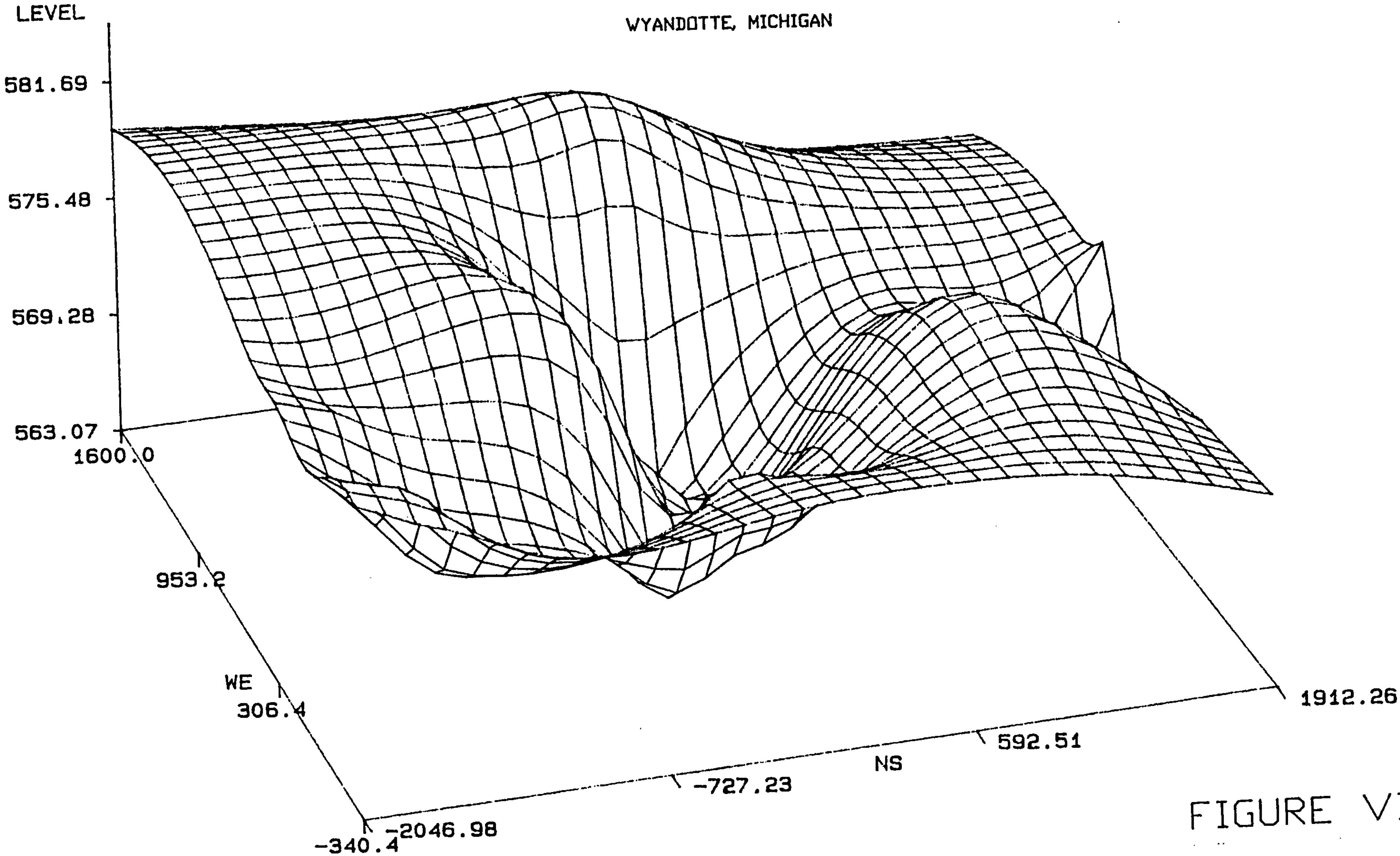


FIGURE VI

BASF will also insure that the property deed applicable to the site be modified or permanently associated with a note which states that management of hazardous waste was conducted on the site in the past and that future use of the property must be compliant with the conditions of 40 CFR 265.117(c). A copy of this document will be provided to the MDNR prior to January 8, 1989.

6) 40 CFR 265.132 - Cost Estimate for Closure

As mentioned in Item (1) above, Storage Area #1 has been closed since March of 1987. The last container stored in the area was transported offsite for disposal on March 25, 1987 (Appendix B). Development of a cost estimate to execute closure of the subject storage area is therefore not pertinent to this document.

7) 40 CFR 265.144 - Estimate of Annual Cost of Post-Closure Care

The cost of operating the groundwater extraction equipment and carbon adsorption system is projected to approximate $600,000 for calendar year 1988. This figure includes the cost of all materials to maintain the system, labor, monitoring/analysis of groundwater conditions, and administrative costs to continue satisfactory operation of the system. Barring unforseen complications, BASF anticipates that the approximate annual cost (in 1988 dollars) to maintain operation of the groundwater remediation system for the period mandated by the 1985 Consent Decree will remain near $600,000.

BASF Corporation is financially prepared to continue expenditures of this magnitude, if necessary, until 2017. Appendix F contains a letter addressed to the MDNR from the Chief Financial Officer of BASF Corporation to demonstrate the corporation's ability to be financially responsible for hazardous waste activities at its facilities (note lines 4-10 on page 6 of the letter).

As indicated in Item (4) above, this section will be appropriately modified should any post-closure changes occur which would cause the above information to be inaccurate or misleading.

APPENDIX A

APPLICABLE CORRESPONDENCE BETWEEN BASF/REGULATORY AGENCIES

P29 2144563

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Permit Contact (5EPO)
U.S. EPA
230 Dearborn Street
Chicago, Il. 60604

Postage	$ .17
Certified Fee	80 ¢
Special Delivery Fee	¢
Restricted Delivery Fee	¢
Show to whom and date delivered	¢
Show to whom, date and address of delivery	55 ¢
Show to whom and date delivered with restricted delivery	¢
Show to whom, date and address of delivery with restricted delivery	¢
TOTAL POSTAGE AND FEES	$ 1.76

POSTMARK OR DATE

RCRA Permit - Wyandotte

PS Form 3800, Apr. 1976

PS Form 3811, Jan. 1979

● SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
- ☐ Show to whom and date delivered .... ¢
- ☒ Show to whom, date and address of delivery .... ¢
- ☐ RESTRICTED DELIVERY
  Show to whom and date delivered .... ¢
- ☐ RESTRICTED DELIVERY.
  Show to whom, date, and address of delivery.$ ____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
Permit Contact (5EPO)
U.S. EPA
230 South Dearborn Street
Chicago, Ill. 60604

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	P29 2144563	

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE ☐ Addressee ☐ Authorized agent

4. DATE OF DELIVERY POSTMARK

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

RECEIVED
NOV 21 1980
U.S. ENVIRONMENTAL PROTECTION AGENCY

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

RCRA Permit Wyandotte

☆GPO : 1979-288-848

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
2819	(specify) Industrial Inorganic chemicals	2821	(specify) Synthetic resins
C. THIRD		**D. FOURTH**	
2833	(specify) Medicinal chemicals		(specify)

VIII. OPERATOR INFORMATION

A. NAME: BASF WYANDOTTE CORP.

B. Is the name listed in Item VIII-A also the owner? ☒ YES ☐ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

P (specify)

D. PHONE (area code & no.): A 201 263 3400

E. STREET OR P.O. BOX: P.O. Box 181

F. CITY OR TOWN	G. STATE	H. ZIP CODE
Parsippany	N.J	07054

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	9 N MI0000540	D. PSD (Air Emissions from Proposed Sources)	9 P
B. UIC (Underground Injection of Fluids)	9 U	E. OTHER (specify)	9 MI0000566 (specify) NPDES
C. RCRA (Hazardous Wastes)	9 R	E. OTHER (specify)	9 MI0001805 (specify) NPDES

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Manufacture of industrial inorganic chemicals, synthetic polyether polyol resins, medicinal chemicals; plus research and pilot plant activities supporting those businesses.

All correspondece regarding this application should be addressed to the office of the Director, Corporate Environmental Protection, BASF Wyandotte Corporation, P.O. Box 181, Parsippany, N.J. 07054

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
R.E. Dunn, Secretary	R E Dunn	11/17/80

COMMENTS FOR OFFICIAL USE ONLY

Fill-in areas are spaced for elite type, i.e., 12 characters/inch.

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

F | M I 0 0 6 4 1 9 7 7 9 2

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

[ ] 2. NEW FACILITY *(Complete item below.)*

*1895

C 8 | YR. * * | MO. | DAY | FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

YR. | MO. | DAY | FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES — CODES AND DESIGN CAPACITIES

A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.
1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C | DUP | T/A C | 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 1	25,300	G		7				
2	S 0 1	100	Y		8				
3	T 0 2	2×10^6	U		9				
4	S 0 2	4,000	G		10				

CONTINUE ON REVERSE

Continued from page 2.
NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY	
W M I D 0 6 4 1 9 7 7 4 2 1	W DUP	2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D000		T	T02	Polyol wastewater (B627)
2	F003	1600	P	S01	non-chlor. solvents (F003)
3	F005	1600	P	S01	non-chlor solvents (F005)
4	F002	1000	P	S01	chlor. solvent (F002)
5	U044	1000	P	S01	chloroform (U044)
6	U211	1000	P	S01	tetrachloromethane (U211)
7	D001	3.5	T	S01	liq. polymer/nonchl. solv (B002)
8	D000	2	T	S01	liq isocyanate/nonchl solv (B604)
9	D001				Included with above
10	D000	.500	P	S01	amines & non-chl. solvent (B605)
11	D000	1000	P	S01	sulfonic acid synthesis waste (B606)
12	D001	500	P	S01	vitamin waste (B607)
13	D001	500	T	S01	Polyol filter cake (B611)
14	D001	500	P	S01	Styrene (B612)
15	U009	500	P	S01	acrylonitrile (U009)
16	D001	2500	P	S01	solvents (B625)
17	U037	250	P	S01	chlorobenzene (U037)
18	D000	5	T	S01	methylene chloride/polymers (B628)
19	D001				Included with above
20	D000	8	T	S01	liquid amine waste (B614)
21	D000	20	T	S01	TDI / Polyol / Prepolymer liq. (B615)
22	D000	22	T	S01	Solid amine waste (B616)
23	D001	20	T	S01	non-chl solv/Polyol/H_2O (B617)
24	D002	8.5	T	S02	waste caustic & Acid (B618, B[illegible] B62[illegible])
25	D000	20	T	S01	Polyurea/isocyanate solids (B621)
26					

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

A

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONA ROCESS CODES FROM ITEM D(1) ON PA(3.

EPA I.D. NO. *(enter from page 1)*

													T/A	C
F	M	I	D	0	6	4	1	9	7	4	4	2		6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

VI. PHOTOGRAPHS

l existing facilities must include photographs *(aerial or ground–level)* that clearly delineate all existing structures; existing storage, eatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
42 12 46	83 08 47

VIII. FACILITY OWNER

[X] A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.*
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

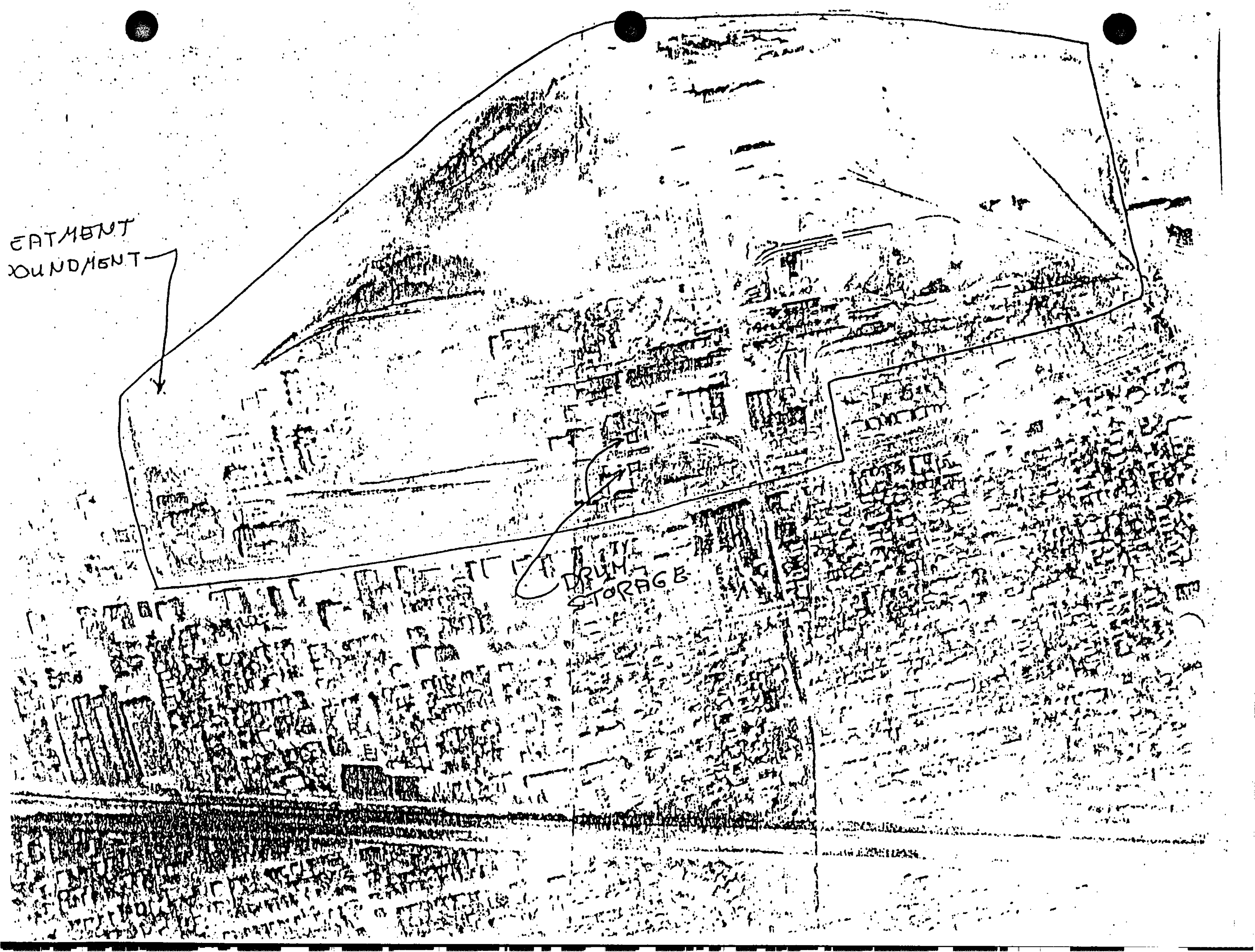
A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
R.E. Dunn, Secretary	R E Dunn	11/7/80

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
R.E. Dunn, Secretary	R E Dunn	11/7/80

CONTINUE ON PAC



EATMENT
OUNDMENT
DRUM
STORAGE

BASF Wyandotte Corporation

100 Cherry Hill Road
P.O. Box 181
Parsippany, N.J. 07054
201/263-0200

April 8, 1981
Cert. Mail Ret. Rec. Req.
P29-2144602

Permit Contact (5EP)
U. S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Ill. 60604

Chron

Gentlemen:

Pursuant to a meeting held on April 2, 1981 with Mr. J. Boyle of your organization, BASF Wyandotte Corporation is submitting a revised and modified RCRA interim permit application. The original application was sent to you on November 17, 1980.

Key modifications are as follows;

1. Application for use of a surface impoundment for treatment has been deleted.

2. All wastes identified as "D000" only have been deleted. (Form 3, page 3).

Surface Impoundment Deletion

The original application included the use of surface impoundment for treatment as a protective action on our part. Normal wastewater flow to the pond is non-hazardous. Once during the past several years an unplanned and sudden spill of a hazardous waste was collected and contained in the pond and removed to rail cars within a 48-hour period. This was a one-time emergency action only. Due to the pond's impermeability (clay base) the short-term action to cleanup the spill prevented environmental contamination.

Subsequent to our original application, on Nov. 19, 1980, EPA published at 45 FR 76626 a definition of a spill as "---- the accidental spilling, leaking, pumping, emitting, emptying or dumping of hazardous wastes or materials which, when spilled, become hazardous waste into or on any land or water", (40CFR260.10(a) (64a)). EPA also promulgated at 40CFR122.21(d) (3) the regulation that "A person is not required to obtain a RCRA permit for those activities he carries out to immediately contain or treat a spill ----". The pond in question clearly falls under the above exclusion.

Waste Deletion

Those wastes originally designated on our application are not RCRA hazardous wastes per 40CFR260; rather, they are wastes which BASF has voluntarily decided to manage as if they were hazardous for self-protective reasons. Mr. Boyle, as well as other EPA officials of other regions, indicated that DOOO was an invalid code.

Due to the permitting exclusion allowed for activities taken to immediately mitigate a spill plus the fact that only non-hazardous waste generally enters the discussed pond, BASF has decided to discontinue further interim status actions for that particular facility.

Kindly inform us within thirty (30) days if our interpretations or decisions are incorrect. Thank you for your assistance.

Very truly yours,

M. A. Wisniewski, P.E.
Manager
Corporate Environmental Protection

MAW:if

bcc: R. E. Dunn
W. Axce
K. Fry
N. D. Roush

BASF Wyandotte Corporation

100 Cherry Hill Road
P.O. Box 181
Parsippany, N.J. 07054
201/263-5280

Keith Fry
Director
Corporate Environmental Protection

Certified Mail
P29 2144641

June 25, 1981

U. S. EPA
Permit Contact (5EP)
230 South Dearborn Street
Chicago, Illinois 60601

Re: RCRA Hazardous Waste Permit, EPA ID # MID 064 197 742

Gentlemen:

BASF Wyandotte Corporation (BWC) has submitted a hazardous waste permit application for BWC's facility in Wyandotte, Michigan on November 18, 1980. The latest revision to the application has been April 8, 1981. Due to an administrative oversight, an incineration process was inadvertantly omitted from Form 3, Part III.

The incinerator was constructed in 1975 and is permitted under Wayne County Air Permit Number APC 0-00460.

BWC hereby submits an amended complete application. Please replace this application form and attachments for the previously submitted information currently on file.

Very truly yours,

Keith Fry,

Keith Fry, Director
Corporate Environmental Protectio

KF:if
attachments
bcc: C. W. Axce
R. E. Dunn
H. D. Roush
J. H. Gebrian

Inter-Office Memorandum

BASF Wyandotte Corporation

To File

Date August 6, 1981

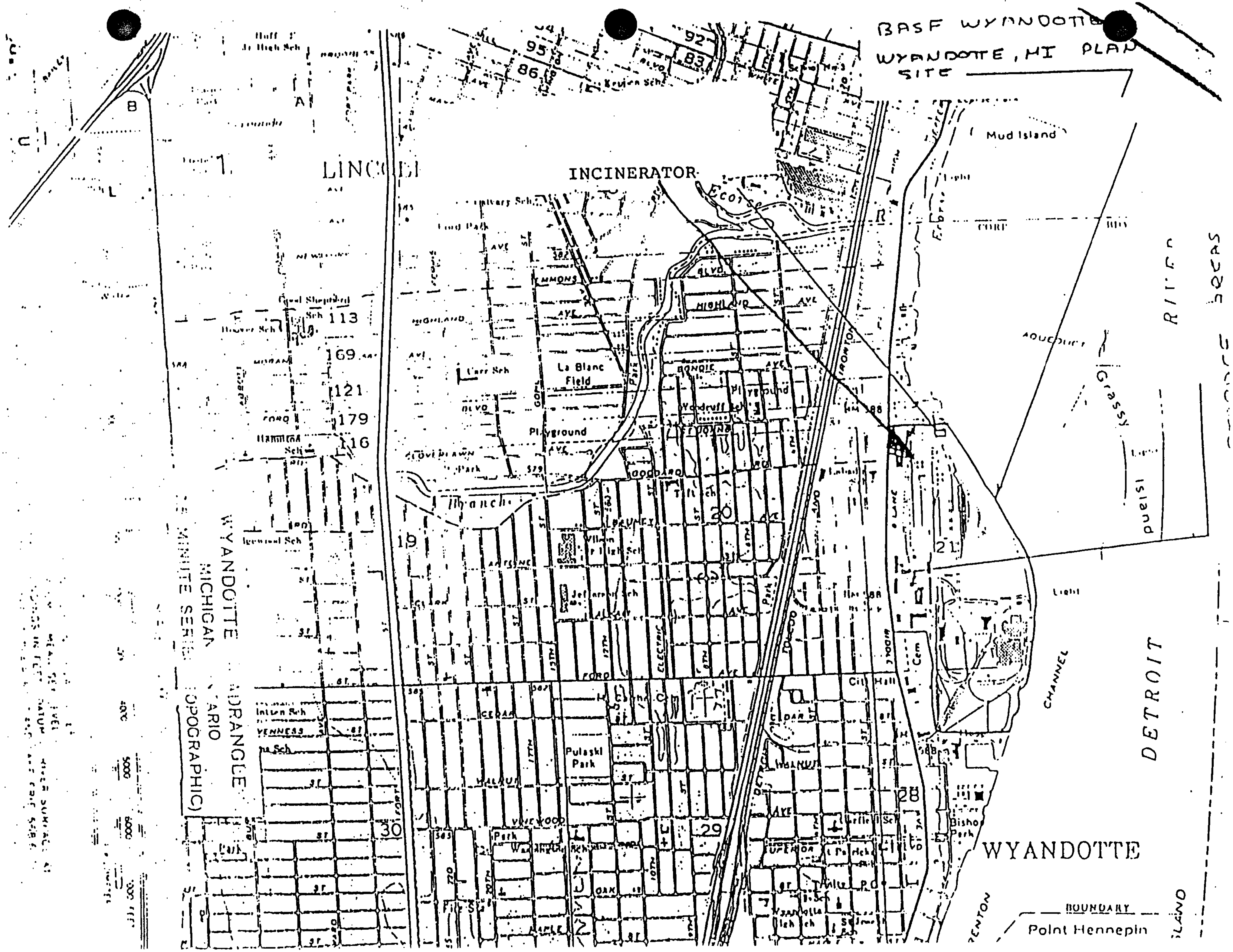
From J. H. Gebrian

Subject RCRA Interim Permit Application

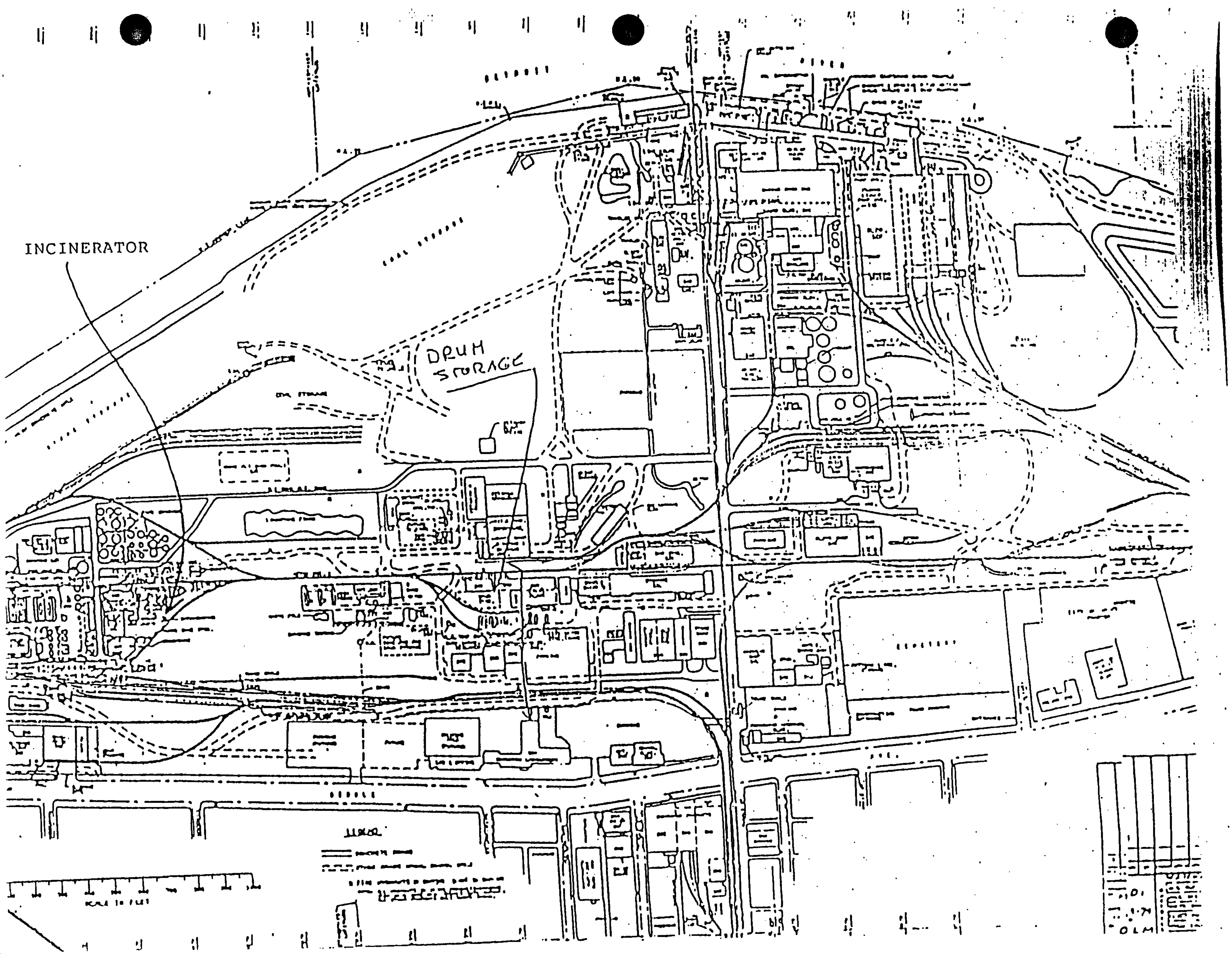
Copies

Reference

Mrs. Elizabeth Utley of EPA Chicago, Illinois office verbally notified us that the surface impoundment included in our original interim application and subsequently requested for deletion has been acknowledged.



BASF WYANDOTTE
WYANDOTTE, MI PLANT SITE
INCINERATOR
Mud Island
Grassy
Island
La Blanc Field
Playground
Pulaski Park
City Hall
Bishop Park
CHANNEL
DETROIT
WYANDOTTE
BOUNDARY
Point Hennepin


INCINERATOR
DRUM STORAGE

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Form Approved OMB No. 158-S80004

FORM 3 RCRA — EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
HAZARDOUS WASTE PERMIT APPLICATION
Consolidated Permits Program
(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER
F MTD064197742

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility o revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility' EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

[ ] 2. NEW FACILITY *(Complete item below.)*

8 — YR. ** MO. DAY — * 1895

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)

YR. MO. DAY — FOR NEW FACILITI PROVIDE THE DATE (yr., mo., & day) OPER TION BEGAN OR IS EXPECTED TO BEGI

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[X] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES — CODES AND DESIGN CAPACITIES

A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.
1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:			**Treatment:**		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	S02	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS	OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY
Disposal:					
INJECTION WELL	D79	GALLONS OR LITERS			
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER			
LAND APPLICATION	D81	ACRES OR HECTARES			
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS			

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. 1. AMOUNT	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 1	25,300	G		7				
2	S 0 1	100	Y		8				
3	S 0 2	4,000	G		9				
4	T 0 3	0.1125	D		10				

...nued from page 2.
...TE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	T/A C	FOR OFFICIAL USE ONLY	T/A C	
W M T D 0 6 4 1 9 7 7 4 2	1	W DUP	2	DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	F003	1600	P	S01				
2	F005	1600	P	S01				
3	F002	1000	P	S01				
4	U044	1000	P	S01				
5	U211	1000	P	S01				
6	D001	3.5	T	S01				
7	D001	2	T	S01				
8	D001	500	P	S01				
9	D001	500	T	S01				
10	D001	500	T	S01				
11	U009	500	P	S01	T03			
12	D001	2500	P	S01				
13	U037	250	P	S01				
14	D001	5	T	S01				
15	D001	20	T	S01				
16	D002	8.5	T	S02				
17	D001	500	P	S01	T03			
18	D001	20	T	S01				
19								
20								
21								
22								
23								
24								
25								
26								

... the front.

[DE]SCRIPTION OF HAZARDOUS WASTES (continued)

[U]SE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. (enter from page 1)

	T/A	C
M I D 0 6 4 1 9 7 4 4 2		6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground—level)* that clearly delineate all existing structures; existing storage, [trea]tment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE (degrees, minutes, & seconds)
42 12 46	83 08 47

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. (area code & no.)
E	- -

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME (print or type)	B. SIGNATURE	C. DATE SIGNED
R. E. Dunn, Secretary	Robert E. Dunn	6/25/81

X. OPERATOR CERTIFICATION

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R. E. Dunn, Secretary	Robert E. Dunn	6/25/81

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Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F MID064197742

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill—in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill—in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold—faced terms.

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	X			D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)				J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)			

III. NAME OF FACILITY

1 SKIP BASF WYANDOTTE CORPORATION

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
2 DIRECTOR, CORP. ENV. PROT.	201 263 5280

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 1609 BIDDLE AVENUE

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 WYANDOTTE	MI	48192

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 1609 BIDDLE AVENUE

B. COUNTY NAME

WAYNE

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE (if known)
6 WYANDOTTE	MI	48192	

...OM THE FRONT

...ODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
2819	(specify) Industrial Inorganic chemicals	7 2821	(specify) Synthetic resins
C. THIRD		**D. FOURTH**	
7 2833	(specify) Medicinal chemicals	7	(specify)

III. OPERATOR INFORMATION

A. NAME

BASF WYANDOTTE CORPORATION

B. Is the name listed in Item VIII-A also the owner? ☒ YES ☐ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

P (specify)

D. PHONE (area code & no.) A 201 263 3400

E. STREET OR P.O. BOX

PO Box 181

F. CITY OR TOWN	G. STATE	H. ZIP CODE
Parsippany	NJ	07054

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)	
9 N MI0000540	9 P	
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**	
9 U	9 MI0000566	(specify) NPDES
C. RCRA (Hazardous Wastes)	**E. OTHER (specify)**	
9 R	9 MI0001805	(specify) NPDES

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Manufacture of industrial inorganic chemcials, synthetic polyether polyol resins, medicinal chemicals; plus research and pilot plant activities supporting those businesses.

All correspondence regarding this application should be addressed to the office of the Director, Corporate Environmental Protection, BASF Wyandotte Corporation, P. O. Box 181, Parsippany, New Jersey 07054

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
R. E. Dunn, Secretary	[signature]	12/5

COMMENTS FOR OFFICIAL USE ONLY

C

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
111 West Jackson Blvd.
CHICAGO, ILLINOIS 60604

KK

REPLY TO ATTENTION OF:
RCRA ACTIVITIES

JUN 10 1982

RECEIVED
JUN 16 1982
Corporate Environmental Protection

Keith Fry, Dir., Corp., Envr. Prot.
BASF Wyandotte Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192

RE: Interim Status Acknowledgement USEPA ID No. MID064197742
FACILITY NAME: BASF Wyandotte Corporation

Dear Mr. Fry:

This is to acknowledge that the U.S. Environmental Protection Agency (USEPA) has completed processing your Part A Hazardous Waste Permit Application. It is the opinion of this office that the information submitted is complete and that you, as an owner or operator of a hazardous waste management facility, have met the requirements of Section 3005(e) of the Resource Conservation and Recovery Act (RCRA) for Interim Status. However, should USEPA obtain information which indicates that your application was incomplete or inaccurate, you may be requested to provide further documentation of your claim for Interim Status. Our opinion will be reevaluated on the basis of this information.

As an owner or operator of a hazardous waste management facility, you are required to comply with the interim status standards as prescribed in 40 CFR Parts 122 and 265, or with State rules and regulations in those States which have been authorized under Section 3006 of RCRA. In addition, you are reminded that operating under interim status does not relieve you from the need to comply with all applicable State and local requirements.

The printout enclosed with this letter identifies the limit(s) of the process design capacities your facility may use during the interim status period. This information was obtained from your Part A Permit application. If you wish to handle new wastes, to change processes, to increase the design capacity of existing processes, or to change ownership or operational control of the facility, you may do so only as provided in 40 CFR Sections 122.22 and 122.23.

As stated in the first paragraph of this letter, you have met the requirements of 40 CFR Part 122.23; your facility may operate under interim status until such time as a permit is issued or denied. This will be preceded by a request from this office or the State (if authorized) for Part B of your application. Please contact Arthur Kawatachi of my staff at (312) 886-7449, if you have any questions concerning this letter or the enclosure.

Sincerely,

Karl J. Klepitsch, Jr.

Karl J. Klepitsch, Jr., Chief
Waste Management Branch

Enclosure
cc: R.F. Dunn, Secretary

BASF Wyandotte Corporation

100 Cherry Hill Road
P.O. Box 181
Parsippany, N.J. 07054
201/263-5280

Keith Fry
Director
Corporate Environmental Protection

Certified Mail
Return Receipt Requested
P29 2144619

March 24, 1982

Mr. Alan J. Howard
Department of Natural Resources
Chief Office of Hazardous Waste Management
P. O. Box 30038
Lansing, Michigan 48909

Dear Mr. Howard:

The purpose of this letter is to inform you that BASF Wyandotte Corporation (BWC) has re-examined the applicability of an Act 64 operating license for the manufacturing process waste gas incinerator at the Graft Polyol Plant in Wyandotte, Michigan.

BWC has carefully reviewed the criteria for determination of wastes to be managed under Act 64 Rules and believes that the waste should be managed as a "notification waste" subject to the provisions of R 299.6203(2)(a). The basis for our determination is as follows:

1. The waste is a manufacturing process waste.
2. The waste is not exempted under R 299.6202.
3. It is not listed in R 299.6301.
4. The waste contains acrylonitrile and styrene as components with generic names listed in Table 302b and 302c.
5. The waste is generated in sufficient quantity and concentration to be a "notification waste" as indicated by Figure B in PART 2.
6. The waste stream is hazardous under subrule (4) of R 299.6302 which states that since the waste contains those components listed in Table 302b and 302c, the notification requirement of R 299.6203(2)(a) may apply.
7. The waste is not listed in R 299.6303, R 299.6304 and R 299.6305.
8. The waste does <u>not</u> contain components in concentrations (the waste gas stream is 90% or more nitrogen) which could impart the hazardous characteristics set forth in R 299.6201(a),(c) or (e).
9. The waste does meet the criteria for toxic waste in R 299.6201 (g)(iv), and therefore the waste is hazardous under subrule (1)(e) of R 299.6203.

10. Since the waste is hazardous under subrule (1)(e) above, the provisions of subrule (2)(a) of R 299.6203 are applicable and require both notification under subrule (2)(a)(i) and disposal of the waste under subrule (2)(a)(ii) at a facility licensed under Act 348.

Therefore, BWC believes it does not need to otherwise manage this waste under the act as long as the provision of R 299.6203(2)(a) are met. BWC hereby files the enclosed Waste Characterization Report, Form R 4911, as set forth under R 299.6904 which defines the characteristics of the waste.

With regard to Act 348, BWC has applied for an installation permit to replace the existing incinerator. Wayne County Air Pollution Control Division, under the jurisdiction of Act 348, has completed their technical review of BWC's application and has issued a "letter of intent" to issue the permit. The intent to issue the permit is subject to the condition that BWC submit dimensional equipment arrangement drawings and instrumentation schematic drawings when made available by the equipment manufacturer. BWC will comply with these conditions and a copy of the memorandum is attached.

In anticipation of DNR concurrence with BWC's evaluation of the applicability of an Act 64 operating license, BWC respectfully requests the DNR return the Act 64 application package and draft addendums dated August 13, 1981, September 30, 1981 and February 15, 1982. BWC by copy of this letter has notified Wayne County Air Pollution Control Division of its determination and the applicability of an Act 64 operating license to this project.

Please contact Mr. Keith Fry at (201) 263-5280 if there are questions concerning BWC's determination.

Very truly yours,

BASF WYANDOTTE CORPORATION

Keith Fry

Keith Fry
Director,
Corporate Environmental Protection

KF:lt

Attachments

cc: W. C. Achinger
A. C. Scheans
H. D. Roush
C. W. Axce

bcc: F. J. Federico
D. C. Figg

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909
HOWARD A. TANNER, Director

KK

June 15, 1982

RECEIVED
JUN 24 1982
Corporate Environmental Protection

Mr. Keith Fry, Director
Corporate Environmental Protection
BASF Wyandotte Corp.
P.O. Box 181
Parsippany, New Jersey 07054

Dear Mr. Fry:

I have received your March 24, 1982 letter regarding BASF Wyandotte's proposed waste gas incinerator at the Graft Polyol Plant in Wyandotte Michigan. In your letter, you requested that your operating license application under Michigan's Hazardous Waste Management Act, Act 64, P.A. 1979, for this facility be withdrawn on the basis that the wastes generated from the Graft Polyol Plant are "notification wastes", and therefore do not require disposal at a facility licensed under Act 64.

After reviewing your demonstration and inspecting the Graft Polyol Plant, this Department concurs that the wastes generated are "notification wastes" under Act 64. As long as emissions of these wastes are permitted under the Water Resources Commission Act, Act 245, P.A. 1929 and the Air Pollution Act, Act 348, P.A. 1965, an operating license under Act 64 is not required. However, please be advised that if you contemplate any future operational changes which would result in a managed hazardous waste being fed to the incinerator, both an Act 64 construction permit and operating license would be required.

I am returning your application as you have requested and have asked that your $500 license application fee be refunded. If you have any further questions regarding the applicability of Act 64 to wastes generated at BASF Wyandotte, please do not hesitate to contact me.

Sincerely,

ENVIRONMENTAL SERVICES DIVISION

Alan J. Howard

Alan J. Howard, Chief
Office of Hazardous Waste Management

AJH/PR:tkr
Enclosure
cc: D. Rector
C. McIntosh, AQD
A. Sheens, Wayne Co. Health Dept.

Fili Hy SW Doc

RECEIVED

AUG 24 1984

Corporate Environmental Protection

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

AUG 20 1984

REPLY TO ATTENTION OF
5HW-13

FILE

R. E. Dunn, Secretary
BASF Wyandotte Corporation
100 Cherry Hill Road
P. O. Box 181
Parsippany, New Jersey 07054

RE: Request for Information--Part A Hazardous Waste Permit Application Review (Treatment by Incineration)
FACILITY NAME: BASF Wyandotte Corporation
U.S. EPA ID NO.: MID064197742

Dear Mr. Dunn:

This letter serves to inform you that the United States Environmental Protection Agency has completed a review of your Part A Hazardous Waste Permit Application. Our review indicates your facility may be required to comply with the incinerator regulations under §3005 of the Resource Conservation and Recovery Act, as amended; however, further clarification is needed.

Based on the information submitted, your facility appears to treat hazardous waste in an incinerator. If it does, you must comply with the incinerator requirements as defined in 40 CFR Part 265 Subpart O (enclosed). If you determine that your facility does not treat hazardous waste in an incinerator, please submit a revised Part A and a detailed explanation of all changes made to the Regional Office indicating your present methods of hazardous waste treatment, storage, or disposal. Unless we receive a reply within 15 days, — 4 Sep we will assume that your facility treats hazardous waste in an incinerator and is subject to all permitting requirements.

Please be advised that if at any time since November 19, 1980, your operation included the treatment of hazardous waste in an incinerator subject to 40 CFR Part 265, a closure plan must be filed with the Regional office. Requirements for closure are found in 40 CFR Part 265 Subpart G (enclosed).

Please contact the Regulatory Analysis and Information Unit at (312) 886-6148 for assistance, if you have any questions. Please refer to "Request for Information--Treatment by Incineration," in all correspondence on this matter.

Sincerely yours,

for [signature] Constantelos

Elmore Christenson, Chief
State Programs and Information Section

by 10th
Allows 6 days & can extend further.

Enclosures

cc: Keith Fry, Director of Corporate Env. Prot.

BASF Wyandotte Corporation

100 Cherry Hill Road
P.O. Box 181
Parsippany, N.J. 07054
201/263-5280

Keith Fry
Director
Corporate Environmental Protection

Certified Mail
P35 1210916
Return Receipt Requested

September 5, 1984

Ms. L. Pierard
US EPA - Region V
Hazardous Waste Management Branch (5HW-13)
230 South Dearborn Street
Chicago, IL 60604

Re: Request for Information - Treatment by Incineration

Dear Ms. Pierard:

The following is provided in response to your request for information dated 20 August 1984, concerning BASF Wyandotte Corporation's (MID064197742) Part A Hazardous Waste Permit Application.

On June 25, 1981, BASF Wyandotte Corporation amended the hazardous waste permit application for our Wyandotte, Michigan facility. The submittal contained a complete amended application and listed an incinerator with the design capacity to process 0.1125 tons per day of hazardous waste. This liquid incinerator was constructed in 1974/75, and was approved for operation in accordance with Wayne County Air Pollution Control Regulations, as amended November 5, 1975. Shortly after start-up, the unit experienced significant difficulties and was temporarily left idle. It was added to our June 1981 hazardous waste permit application in the event the unit was recommissioned. It was, however, subsequently decided in 1982 to permenantly decommission and dismantle the unit. Dismantling was completed in December 1982.

The incinerator has not operated since November 19, 1980, and has never treated regulated hazardous waste. BASF Wyandotte Corporation, therefore, requests that by receipt of this letter EPA amend our current hazardous waste permit application by deleting reference to this unit on Form 3, Parts III and IV. BASF Wyandotte Corporation will similarly amend our files.

Very truly yours,

BASF WYANDOTTE CORPORATION

Keith Fry

Keith Fry, Director
Corporate Environmental Protection

ADG/ja
cc: HD Roush

APR 21 1988

11/30/86

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

S.E. Michigan Field Office
15500 Sheldon Road
Northville, MI 48167

December 30, 1985

Mr. H. Dale Roush
BASF Wyandotte Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192

Re: MID 064197742

Dear Mr. Roush:

On December 10, 1985, acting as a representative of the United States Environmental Protection Agency, I performed an inspection of your facility located at 1609 Biddle Avenue, Wyandotte, Michigan. The purpose of this inspection was to evaluate compliance of that facility with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) as amended.

As a result of that inspection, it has been determined that the above facility is in violation of some of the requirements of Subtitle C of RCRA. Specifically, the following was found:

(1) 40 CFR 261.2, e(1), F - These sections allow certain recycled materials to be exempt from the definition of solid waste and, therefore, regulation, if there is documentation that the materials meet the exclusion.

The facility's waste acetic acid generated by the Vitamin E plant is considered a high grade material which is sold at about 75% of the going rate for the commercial product. This would indicate the material qualifies for the 261.2e exemption, however, there was no information available regarding its end use let alone documentation of the material being recycled or used as a commercial product substitute.

This facility also used ferrous sulfate crystals separated from pickling liquor (K062) that were supplied by Ever Lock in Taylor. These were used in BASF's pigment operation. This appears to also be exempt if proper documentation is available. If the facility receives quantity in excess of that which is used in pigments, the excess may be a regulated waste.

(2) 40 CFR 270.71 - This section states that during interim status a facility shall not treat, store or dispose of hazardous waste except as specified in the Part A. Revisions can be made in the Part A as allowed in Section 270.72.

The facility representatives last submitted a revised Part A on June 25, 1981. This was again revised by letter dated September 5, 1984, which requested removal of an inoperative incinerator. The resulting Part A lists these storage areas: (1) a drum storage area within the research building; (2) an outdoor drum storage area; and (3) the bulk storage of the waste acetic acid discussed above.

The facility closure plan dated April 23, 1985, and the inspection identified differences from the Part A.

The drum storage area (1) within the research building was no longer listed as a storage area but rather was considered a satellite area. This will be discussed later. The closure plan identified a 90 day storage area in a warehouse. However, this site was actually being used for longer than 90 days and for offsite (Troy) waste storage. This was not in compliance with the Part A and its revisions.

(3) Only generators storing their own wastes (up to 90 days) and transporters (for 10 days) are allowed to store wastes without being in compliance with TSD requirements. The facility had eight drums of wastes from offsite and was not in compliance with:

(a) 265.13	Waste analysis
(b) 265.71	Manifests
(c) 265.73	Operating record

(4) 40 CFR 265 Subpart D - This section requires a contingency plan to be prepared containing updated emergency numbers and to be distributed to local agencies.

The facility's contingency (PIP) plan had not been updated. The numbers for three local and one state agency were wrong. The plan needs to be updated and distributed to the referenced local agencies.

The following are not violations but areas needing further review.

(A) The facility's liability insurance is worded such that it appears the entire BASF corporation has a two million dollar aggregate policy. This is required for each of the four BASF - TSD facilities and, therefore, needs clarification.

(B) The facility listed the isocyanate and polyol filter cake wastes as corrosive (D002) on the Part A. As both are reportedly water reactive, it would seem the hazards would be better represented by the reactive (D003) designation.

(C) The position was taken that only the two environmental positions required training. The presence of waste placed in a reportedly closed storage area, off site waste in storage, unknown waste containers placed in the storage and missing labels and dates would seem to indicate that others at the facility need to be trained.

(D) The storage in the research lab area is said to be a satellite area. This was not inspected. The facility needs to ensure that the area complies with the satellite area conditions.

(E) The proposed closure of the ~~paved~~ CONCRETE outdoor storage area should be able to be done easily when waste is no longer stored there. It appeared to be clean and well maintained.

(F) The facility had requested a variance from classification as solid waste for the heptane and methanol waste streams. These were used as carrier solvents in the vitamin manufacturing operation. The operations seemed to be environmentally sound and an efficient use of materials. It's been recommended that the variance be approved.

You are requested to respond to this letter by January 30, 1986, providing documentation to this office regarding those actions taken to correct these violations. If you have any questions regarding this matter, please feel free to contact me at (313) 459-9180.

Sincerely,

Margaret A. Field's

Margaret A. Field's
HAZARDOUS WASTE DIVISION

MAF:mlm
enc.
cc: U.S. EPA, Region V
B. Okwumabua

STATE OF MICHIGAN TRANSMITTAL

TO: NAME	TO: NAME
1. H. D. Roush	5. BASF-Chemicals Div.
2.	6. Attn: H. D. Roush
3.	7. 1609 Biddle Ave.
4.	8. Wyandotte, MI 48192

FOR ACTION AS INDICATED

☐ SIGNATURE	☐ REPLY-MY SIGNATURE	☐ NOTE AND FORWARD
☐ APPROVAL	☐ REPLY-COPY TO ME	☐ NOTE AND FILE
☐ ACTION	☐ PLEASE SUMMARIZE	☐ NOTE AND RETURN
☐ COMMENTS	☐ PLEASE INVESTIGATE	☐ PLEASE PHONE ME
☐ INFORMATION	☒ FORWARDED PER REQUEST	☐ PLEASE SEE ME

REMARKS: This is the documentation we have in our files regarding the status of the incinerator. I have spoken w/ Rhonda Hall and she will be contacting both EPA and her supervisor on this issue. We can discuss the incinerator during the 10/19 meeting.

FROM Dana W. Devantier

DATE 10/13/88

FORM 10580

/F Wyandotte Corporation

100 Che... P O. Box 181 Parsippany, N.J. 07054 201/263-5280

RECEIVED SEP 20 1984 HAZARDOUS WASTE DIVISION

RECEIVED SEP 24 1984

Keith Fry
Director
Corporate Environmental Protection

Certified Mail
P35 1210916
Return Receipt Requested

September 5, 1984

Ms. L. Pierard
US EPA - Region V
Hazardous Waste Management Branch (5HW-13)
230 South Dearborn Street
Chicago, IL 60604

RECEIVED SEP 11 1984 WMD-RAIU EPA, REGION V

Re: Request for Information - Treatment by Incineration

Dear Ms. Pierard:

The following is provided in response to your request for information dated 20 August 1984, concerning BASF Wyandotte Corporation's (MID064197742) G,TSD,PA, Part A Hazardous Waste Permit Application.

On June 25, 1981, BASF Wyandotte Corporation amended the hazardous waste permit application for our Wyandotte, Michigan facility. The submittal contained a complete amended application and listed an incinerator with the design capacity to process 0.1125 tons per day of hazardous waste. This liquid incinerator was constructed in 1974/75, and was approved for operation in accordance with Wayne County Air Pollution Control Regulations, as amended November 5, 1975. Shortly after start-up, the unit experienced significant difficulties and was temporarily left idle. It was added to our June 1981 hazardous waste permit application in the event the unit was recommissioned. It was, however, subsequently decided in 1982 to permenantly decommission and dismantle the unit. Dismantling was completed in December 1982.

The incinerator has not operated since November 19, 1980, and has never treated regulated hazardous waste. BASF Wyandotte Corporation, therefore, requests that by receipt of this letter EPA amend our current hazardous waste permit application by deleting reference to this unit on Form 3, Parts III and IV. BASF Wyandotte Corporation will similarly amend our files.

Very truly yours,

BASF WYANDOTTE CORPORATION

Keith Fry

Keith Fry, Director
Corporate Environmental Protection

ADG/ja
cc: HD Roush

RCRA INSPECTION REPORT

EPA Identification Number: MID 064197742

Installation Name: BASF WYANDOTTE CORP

Location Address: 1609 BIDDLE AVE

City: WYANDOTTE State: MI 48192

Date of Inspection 12/10/85 Time of Inspection (from) 9:30AM (to) 4PM

Person(s) Interviewed	Title	Telephone
H. DALE ROUSH	MNGR ENVIR. PROT. HEALTH + SAFETY	(313) 282-3300

Inspector(s)	Agency/Title	Telephone
MARGARET FIELD'S	MDNR/EQA	(313) 459-9180

Installation Activity (mark only one box)	Inspection Form(s)
☒ Treatment/Storage/Disposal per 40 CFR §265.1 and/or Generation and/or Transportation	A
☐ Treatment/Storage/Disposal (No Generation or Transportation)	A
☐ Generation and Transportation	B,C
☐ Generation Only	B
☐ Transportation Only	C

INSPECTION FORM A

Section A: SCOPE OF INSPECTION.

1. Interim status standards for treatment storage or disposal of HAZARDOUS WASTES SUBJECT TO 40 CFR 265.1. Complete Inspection Form A sections B, C, D, E, and G.

2. Place an "X" in the box(es) corresponding to the facility's treatment, storage and disposal processes, and generation and/or transportation activity (if any). Complete only the applicable sections and appendixes.

Permit application process(es) (EPA Form 3510-3)			Inspection Form A section(s)
S01	[X]	storage in containers	I
S02	[ ]	storage in tanks Considered a product see letter	J
T01	[ ]	treatment in tanks	J
S04	[ ]	storage in surface impoundment	K,F
T02	[ ]	treatment in surface impoundment	K,F
D83	[ ]	disposal in surface impoundment	K,F
S03	[ ]	storage in waste pile	L
D81	[ ]	disposal by land application	M,F
D80	[ ]	disposal in landfill	N,F
T03	[ ]	treatment by incineration Notified but never used & withdrew	O/P
T04	[ ]	treatment in devices other than tanks, surface impoundments, or incinerators	Q

Other activities

GENERATOR	[X]	APPENDIX	GN
TRANSPORTER	[ ]	APPENDIX	TR

3. Indicate any hazardous waste processes, by process code, which have been omitted from Part A of the facility's permit application.

NONE - But recommend reclassifying isocyanates as D003 & adding D[illegible]

4. Indicate any hazardous waste processes (by process code and line number on EPA Form 3510-3 page 1 of 5) which appear to be eligible for exclusion per 40 CFR 265.1(c). Provide a brief rationale for the possible exclusion.

The part A shows incineration but this has been withdrawn by letter

BASF Corporation
Chemicals Division

BASF

CERTIFIED MAIL - RETURN RECEIPT
REQUESTED: P 803 601 591

October 11, 1988

Mr. Alan Howard
Michigan Department of Natural Resources
Waste Management Division
P. O. Box 30028
Lansing, MI 48909

Dear Mr. Howard:

In November of 1980, BASF Corporation, Chemicals Division (BASF) in Wyandotte, Michigan provided Federal/State environmental agencies with the appropriate notification and application forms to be granted Interim Status for operation of a hazardous waste Treatment, Storage, or Disposal (TSD) facility under the Resource Conservation and Recovery Act (RCRA). These documents were submitted as a "protective filing," as BASF desired to be in full compliance with the newly promulgated hazardous waste management regulations.

BASF's TSD Part A application includes two (2) container storage areas and a 4,000-gallon tank. It has come to the attention of BASF that one of the two drum storage areas and the 4,000-gallon tank should have either not been included on the application or the application should have been subsequently amended to delete those items. The reasons for our opinion on this matter are listed below:

- <u>100 Cubic Yard Container Storage Area</u>

  The Research & Development facilities of the Wyandotte complex are located on the west side of the BASF property. A storage building is located slightly southeast of these facilities and adjacent to this building is a 6.75 ft. x 26 ft. long concrete pad. The type of hazardous waste materials that BASF has temporarily stored in this area are ignitable wastes ("D" wastes) and wastes from non-specific sources ("F" wastes).

  Since filing the TSD Part A application in November of 1980, BASF has never stored hazardous wastes on the concrete pad described above for a period of time exceeding 90 days. All hazardous wastes stored on the pad were also transported off-site to an appropriately licensed disposal site within 90 days of the date when wastes began accumulating in that area.

- <u>4,000-Gallon Tank</u>

  The subject tank is an in-line component of BASF's Vitamin E manufacturing process. The acetic acid that accumulates in the tank is a by-product of this manufacturing process. The acid is not contaminated with residual chemical constituents (e.g., excessive heavy metals) to the extent that it is unusable. The normal procedure at BASF is to sell the acetic acid to a buyer. BASF believes that when this procedure is followed the material does not meet the definition of "solid waste" provided in 40 CFR 261.2 or (Michigan) Act 64 since the material is not normally discarded.

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

On four occasions in the past 8 years the subject tank became full of acetic acid and BASF did not have a party available to purchase the material. On these occasions BASF completely emptied the tank, manifested the acetic acid as a hazardous waste, and shipped the material off-site for neutralization/disposal. BASF emphasizes that since November of 1980, waste acid could never have been stored in the tank for a period of time exceeding 90 days. The Vitamin E manufacturing process is a continuously operated system and acetic acid is generated at a rate of approximately 185 gallons/operating day. This flow rate is sufficient to fill the 4,000-gallon tank to full capacity within approximately 22 operating days. If the tank becomes full, process operators are required to shut down the system (a condition considered highly undesirable by BASF).

Since November, 1987, a 1-inch diameter process waste pipe has been connected from the subject tank to a neutralization vessel. When a buyer is not available, the acetic acid is pumped to the neutralization vessel, the pH is adjusted, and the resultant solution is discharged to the sanitary sewer (with permission from the local wastewater authority).

BASF respectfully requests that the Michigan Department of Natural Resources (MDNR) amend our current TSD Part A permit application by deleting reference to the 100-cubic yard container storage area and the 4,000-gallon tank on Form 3 Section III. BASF further requests that the MDNR confirm in writing that the permit application has been amended. Notwithstanding any notification to the contrary, BASF will consider that by MDNR receipt of this letter the subject tank will no longer be considered part of our respective TSD Part A permit application.

As a current employee and duly authorized representative of BASF Corporation Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

H. D. Roush
Manager
Quality & Ecology Services Department

mh
atts.

bc: CWAxce
KFry
NEHowe
LRTetzlaff

BASF CORPORATION, CHEMICALS DIVISION
WYANDOTTE, MICHIGAN

AFFIDAVIT STATEMENT

BASF's Vitamin E manufacturing process includes a 4,000-gallon tank as an in-line component vessel. Acetic acid accumulates in the tank as a by-product of the Vitamin E manufacturing process. This acid is not contaminated with residual chemical constituents (e.g., excessive heavy metals) to the extent that it is unusable. Normal BASF procedure is to sell the acetic acid to a buyer.

On four occasions in the past eight years the subject tank became full of acetic acid and BASF did not have a party available to purchase the material. On these occasions BASF completely emptied the tank, manifested the acetic acid as a hazardous waste and shipped the material off-site for neutralization/disposal. BASF emphasizes that since November of 1980, waste acid could never have been stored in the tank for a period of time exceeding 90 days. The Vitamin E manufacturing process is a continuously operated system and acetic acid is generated at a rate of approximately 185 gallons/operating day. This flow rate is sufficient to fill the 4,000-gallon tank to full capacity within approximately 22 operating days. If the tank becomes full, process operators are required to shut down the system (a condition considered highly undesirable by BASF).

Since November 1987, a one-inch diameter process waste pipe has been used to divert this stream to a neutralization vessel. When a buyer for the acetic acid is not available, the acid is pumped to the neutralization vessel, the pH is adjusted, and the resultant solution is discharged to the sanitary sewer.

As a current employee and duly authorized representative of BASF Corporation, Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

L R Tetzlaff
L. R. Tetzlaff
Superintendent - Vitamin E Plant

Date 10/12/88

BASF CORPORATION, CHEMICALS DIVISION
WYANDOTTE, MICHIGAN

AFFIDAVIT STATEMENT

The Research & Development facilities of the Wyandotte complex are located on the west side of the BASF property. A storage building is located slightly southeast of these facilities and adjacent to this building is a 6.75 ft. x 26 ft. long concrete pad. The type of hazardous waste materials that BASF has temporarily stored in this area are ignitable wastes ("D" wastes) and wastes from non-specific sources ("F" wastes).

Since filing the TSD Part A application in November of 1980, BASF has never stored hazardous wastes on the concrete pad described above for a period of time exceeding 90 days. All hazardous wastes stored on the pad were also transported off-site to an appropriately licensed disposal site within 90 days of the date when wastes began accumulating in that area.

As a current employee and duly authorized representative of BASF Corporation, Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Richard A. Moore — Date October 11, 1988

Richard A. Moore
Safety & Ecology Coordinator - R&D

APPENDIX B

AFFIDAVIT STATEMENTS BY BASF EMPLOYEES/REPRESENTATIVES

BASF CORPORATION, CHEMICALS DIVISION
WYANDOTTE, MICHIGAN

AFFIDAVIT STATEMENT

The Research & Development facilities of the Wyandotte complex are located on the west side of the BASF property. A storage building is located slightly southeast of these facilities and adjacent to this building is a 6.75 ft. x 26 ft. long concrete pad. The type of hazardous waste materials that BASF has temporarily stored in this area are ignitable wastes ("D" wastes) and wastes from non-specific sources ("F" wastes).

Since filing the TSD Part A application in November of 1980, BASF has never stored hazardous wastes on the concrete pad described above for a period of time exceeding 90 days. All hazardous wastes stored on the pad were also transported off-site to an appropriately licensed disposal site within 90 days of the date when wastes began accumulating in that area.

As a current employee and duly authorized representative of BASF Corporation, Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Richard A. Moore — Date October 11, 1988

Richard A. Moore
Safety & Ecology Coordinator - R&D

BASF CORPORATION, CHEMICALS DIVISION
WYANDOTTE, MICHIGAN

AFFIDAVIT STATEMENT

BASF's Vitamin E manufacturing process includes a 4,000-gallon tank as an in-line component vessel. Acetic acid accumulates in the tank as a by-product of the Vitamin E manufacturing process. This acid is not contaminated with residual chemical constituents (e.g., excessive heavy metals) to the extent that it is unusable. Normal BASF procedure is to sell the acetic acid to a buyer.

On four occasions in the past eight years the subject tank became full of acetic acid and BASF did not have a party available to purchase the material. On these occasions BASF completely emptied the tank, manifested the acetic acid as a hazardous waste and shipped the material off-site for neutralization/disposal. BASF emphasizes that since November of 1980, waste acid could never have been stored in the tank for a period of time exceeding 90 days. The Vitamin E manufacturing process is a continuously operated system and acetic acid is generated at a rate of approximately 185 gallons/operating day. This flow rate is sufficient to fill the 4,000-gallon tank to full capacity within approximately 22 operating days. If the tank becomes full, process operators are required to shut down the system (a condition considered highly undesirable by BASF).

Since November 1987, a one-inch diameter process waste pipe has been used to divert this stream to a neutralization vessel. When a buyer for the acetic acid is not available, the acid is pumped to the neutralization vessel, the pH is adjusted, and the resultant solution is discharged to the sanitary sewer.

As a current employee and duly authorized representative of BASF Corporation, Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

L R Tetzlaff

L. R. Tetzlaff
Superintendent - Vitamin E Plant

Date 10/12/88

BASF CORPORATION - CHEMICALS DIVISION
WYANDOTTE, MICHIGAN

AFFIDAVIT STATEMENT

BASF Corporation - Chemicals Division (BASF) operates a 230-acre industrial complex in Wyandotte, Michigan which is often referred to as the North Works. Manufacturing and research operations at this complex generate several types of hazardous waste materials. Past BASF practice was to store materials on-site in containers at a concrete pad located in the approximate center of the complex until off-site transport became practical from a economical perspective. This storage area was designated in BASF's November 18, 1980 Part A application for a hazardous waste management facility permit and was listed as having a storage capacity of 25,300 gallons. BASF refers to the area as Storage Area #1.

In the last quarter of 1986, BASF discontinued the practice of placing hazardous waste containers in Storage Area #1 and made arrangements to transport all hazardous wastes stored in the area off-site to appropriately licensed disposal facilities. The last drum of hazardous waste materials was removed from the subject storage area on March 25, 1987. Since that date, no hazardous wastes have been placed in the area and BASF considers Storage Area #1 closed.

As a current employee and duly authorized representative of BASF Corporation - Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Lyman A Anderson Date Nov 4, 1988

Lyman A. Anderson
Ecology Supervisor

APPENDIX C

1983 CIVIL ACTION INITIATED BY MDNR/STATE OF MICHIGAN

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

FRANK J. KELLEY, Attorney General for the State of Michigan, ex rel MICHIGAN NATURAL RESOURCES COMMISSION, MICHIGAN WATER RESOURCES COMMISSION, and DR. RONALD SKOOG, Ph.D., Director of the Michigan Department of Natural Resources,

Plaintiffs,

v

Civil Action No. 83CV4712DT

BASF WYANDOTTE CORPORATION,

Defendant.

______________________________/

COMPLAINT

FRANK J. KELLEY
Attorney General

Stewart H. Freeman
Assistant Attorey General
In Charge

Stephen F. Schuesler
Assistant Attorney General
Environmental Protection Divisi
720 Law Building
Lansing, MI 48913
(517) 373-7780

Dated: OCT 31 1983

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

FRANK J. KELLEY, Attorney General for the State of Michigan, ex rel MICHIGAN NATURAL RESOURCES COMMISSION, MICHIGAN WATER RESOURCES COMMISSION, and DR. RONALD SKOOG, Ph.D., Director of the Michigan Department of Natural Resources,

Plaintiffs,

v — Civil Action No.

BASF WYANDOTTE CORPORATION,

Defendant.
______________________________/

COMPLAINT

Plaintiffs, by their attorneys Frank J. Kelley, Attorney General, and Stewart H. Freeman and Stephen F. Schuesler, Assistant Attorneys General, complain as follows:

STATEMENT OF THE CASE

1. This is a civil action instituted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC § 9601, et seq, the Resource Conservation and Recovery Act, 42 USC § 6901, et seq, and pursuant to state law, the Michigan Water Resources Commission Act, 1929 PA 245, MCL 321.1 et seq; MSA 3.521 et seq, the Michigan Environmental Protection Act, 1970 PA 127,

MCL 691.1201, et seq; MSA 14.528(201) et seq, and the common law of the State of Michigan. Plaintiffs seek damages, injunctive and other relief as a result of the substantial injury and endangerment to health and the environment caused by the disposal of hazardous chemical wastes into the ground, groundwater, and surface waters in and around the City of Wyandotte, Michigan.

JURISDICTION, VENUE, AND NOTICE

2. This Court has jurisdiction over this action pursuant to 28 USC § 1331, 42 USC § 9613, and 42 USC § 6972.

3. Venue is proper in this district, pursuant to 28 USC § 1391(b), 42 USC § 9613, and 42 USC § 6972, the violations and damages having there occurred.

4. More than sixty (60) days prior to the filing of this Complaint, notice of the violation alleged and the claim made herein was presented pursuant to 42 USC §§ 6972 and 9612 to the Defendant, who is the owner of the facility from which hazardous substances have been released, and to the Administrator. The claim has not been satisfied.

THE PARTIES

5. Plaintiff Frank J. Kelley is the duly elected Attorney General of the State of Michigan, holding such

office pursuant to the provisions of Constitution 1963, article 5, section 21. He is the head of the Department of the Attorney General created by the Executive Organization Act, 1965 PA 380, MCL 16.150; MSA 3.29(50). The Attorney General possesses both statutory and common law powers to bring this action on behalf of the people of the State of Michigan and its governmental agencies.

6. The Michigan Natural Resources Commission supervises the Michigan Department of Natural Resources (hereinafter, DNR) pursuant to 1965 PA 380, MCL 16.350 _et seq_; MSA 3.29(50), _et seq_; and has been designated by the Governor in Executive Order 1973-2 as "the state entity responsible for the development and coordination of all environmental functions and programs of the State of Michigan."

7. Dr. Ronald Skoog is the Director of the DNR.

8. The Michigan Water Resources Commission (hereinafter, WRC) is a board of statewide jurisdiction, created pursuant to the Michigan Water Resources Commission Act, _supra_. Under this Act, the WRC is directed to "protect and conserve the water resources of the state and shall have control of the pollution of surface or underground waters of the state and the Great Lakes...." MCL 323.2.*

---

*Certain authority, powers, duties, functions, and responsibiliti of the WRC have been transferred to the DNR. _See_ Executive Order 1973-2 and 1976-8.

9. Defendant BASF Wyandotte Corporation (hereinafter, BASF) is a Michigan corporation doing business in the city of Wyandotte, Michigan, where it owns and operates a chemical plant. BASF, formerly known as Wyandotte Chemical Corporation, is a wholly-owned subsidiary of BASF America Corporation, a Delaware corporation with its principal place of business in the State of New Jersey. BASF America Corporation is a wholly-owned subsidiary of BASF Aktiengesellschaft, a corporation organized under the Federal Republic of West Germany, with its principal place of business in Ludwighaven, West Germany.

CHEMICAL CONTAMINATION AT THE NORTH AND SOUTH WORKS.

10. Defendant owns two parcels of land in the city of Wyandotte, Wayne County, Michigan, which it has used in the manufacture, storage and distribution of chemical products. One parcel, which will be referred to hereinafter as the "North Works" may be generally described as bounded on the east by the Trenton Channel of the Detroit River, on the west by Biddle Avenue, on the north by Perry Place Street, and on the south by Mulberry Street. The other parcel, hereinafter referred to as the "South Works," may generally be described as bounded on the east by the Trenton Channel of the Detroit River, on the west by Biddle Avenue, on the north by Pine Street, and on the South by Wye Street. A more exact description of the North and South Works is set forth in Exhibit A.

11. On May 26, 1981, the United States of America and its Environmental Protection Agency secured from this Court a warrant pursuant to 42 USC § 6927 allowing entry, inspection, photographing and sampling of the soils and water on and under the North and South Works.

12. On May 27, 1981, the State of Michigan and its DNR obtained from the 27th District Court, 1st Division, for the County of Wayne, a warrant allowing entry, inspection, and sampling of the soils and water on and under the North and South Works.

13. In June of 1981, the DNR began a hydrogeological investigation at the North and South Works. Sediments and groundwater samples were collected from various sites on these two parcels. Site number one is an open area just south of the polyol process facility on the North Works. Site number two is the old coke production and bi-products area, and is just east of site number one on the North Works. Site number three is an elevated area used for land disposal southwest of a coal pile on the North Works. Sites 4 and 5 are open areas on the south end of the North works and are just west of the large brine storage pond. Site number six is located on the southeast portion of the South Works. Site number seven is at the north end of the South Works. Site number eight is north and west of site six on the South Works. These site locations are shown with greater specificity

in Exhibit B. In addition, soil and groundwater samples were collected from the "drum pad" located northwest of the Pilot Plant on the North Works and from the "Emergency Containment Pond" located on the east side of the Pilot Plant. Other samples were collected from the "polyol pond", a small pond of liquid wastes located near the polyol process plant on the North Works and connected to the polyol process area by a small trench.

14. Analysis of the samples collected in June of 1981 from the above-described sites on the North and South Works indicates that the soils, surface water and groundwater are subject to serious chemical contamination. The results of that sampling are set forth in Exhibit C, tables 1 through 5.

15. The groundwater under the North and South Works flows into the Trenton Channel of the Detroit River. Surface water on these sites runs into the Trenton Channel of the Detroit River during periods of heavy rain.

16. The hazardous chemicals which contaminate the soil, groundwater and surface water at the North and South Works are moving and will continue to move off-site into the Trenton Channel of the Detroit River unless corrective measures are taken. The contamination of the soil, groundwater and surface water on and under the North and South Works is

the result of hazardous chemicals which were placed, dumped or spilled on-site by BASF.

17. The Detroit River in the vicinity of the North and South Works has been designated for total body contact recreation. 1979 Michigan Administrative Code, Vol 1, R 323.1110.

18. The Detroit River downstream from the North and South Works is used extensively by the public for swimming, fishing, and boating.

19. The Detroit River flows into Lake Erie which is a source of public drinking water.

20. Some of the hazardous chemicals which contaminate the soil, groundwater, and surface water on and under the North and South Works are described in paragraphs 21 through 36 of this Complaint. An acute toxicity table describing various aspects of these contaminants is attached as Exhibit D.

21. Styrene was found in the groundwater at sites 1 and 5 in concentrations from 45 to 730 micrograms per liter (ug/l). Styrene is toxic to land and aquatic organisms.

Available data indicates that this chemical is carcinogenic to mice, causing an increased incidence of lung tumors. Styrene is mutagenic, having been shown to cause damage to DNR of test organisms.

22. Benzene was found in the groundwater at sites 1, 2, 4 and 5 in concentrations ranging from 13 to more than 200,000 ug/l. Benzene is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act, 33 USC 1317(a)(1). 43 Fed. Reg. 4108. Benzene is toxic to terrestrial life by ingestion, and highly toxic to aquatic organisms. It has also been shown to cause severe adverse effects on the blood forming organs, resulting in hyperplastic anemia, and decreased red and white blood cell counts. Inhalation exposure of experimental animals to benzene during pregnancy has resulted in birth defects. Benzene has been shown to cause leukemia after prolonged occupational exposures. The International Agency For Research On Cancer (IARC) has determined that there is sufficient evidence to indicate that benzene is carcinogenic to humans.

23. Hexachlorobenzene (HCB or C-66) was found in the groundwater at site 7 in concentrations ranging from 140 to 435,000 ug/l. Chlorinated benzenes are designated as toxic pollutants under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. HCB has been shown to be carcinogenic in mice

and hamsters. HCB is toxic to land and aquatic organisms and is extremely persistant in the environment.

24. Hexachlorobutadiene was found in the groundwater and sediments at sites 1 and 7 in concentrations from 0.10 to 800,000 parts per billion (ppb). Hexachlorobutadiene is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. Hexachlorobutadiene is a potential animal carcinogen and has been shown to cause kidney tumors in laboratory rats. It is toxic to mammals and extremely toxic to aquatic life. Chronic exposures result in kidney damage in animals.

25. Chloroform was found in the groundwater at sites 1, 7 and 8 in concentrations from 4 to 100 ug/l. Chloroform is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. Chloroform has been found to cause liver tumors in mice and renal tumors in rats, and is considered an animal positive carcinogen. Chloroform has also been found to cause birth defects in rats exposed to vapors during pregnancy. Toxicological effects from chloroform poisoning include central nervous system (CNS) depression, liver toxicity, and renal damage.

26. Tetrachloroethylene was found in the groundwater at site 7 in concentrations from 15,000 to 19,000 ug/l. Tetrachloroethylene is designated as a toxic pollutant under

§ 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. Tetrachloroethylene has been shown to cause liver cancer in laboratory mice and is considered a potential animal carcinogen. It is toxic to animals and fish.

27. Trichloroethylene (TCE) was found at site 7 in the groundwater at concentrations from 2 to more than 320,000 ug/l. TCE is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. TCE has been shown to induce cancer in laboratory mice. Ingestion and inhalation of TCE has been shown toxic to terrestrial life. TCE is acutely toxic to aquatic life.

28. Vinyl Chloride (VC) was found in the groundwater at site 7 at a concentration of 890 ug/l. VC is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. VC is a human carcinogen. It has been shown to cause a rare form of liver cancer in occupationally exposed workers and in laboratory animals.

29. Benzo (a) Pyrene and Benzo (a) Anthracene were found in the groundwater and soils at Site 2 and the drum pad site in concentrations from 14 to 2,700 ppb. These two chemicals are polynuclear aromatic hydrocarbons (PAH's). PAH's have been designated as toxic pollutants under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. PAH's

have been shown to induce cancer in experimental animals. PAH compounds in general have been classified as human health hazards due to their potential for inducing malignant transformations. Regenerative tissues such as intestinal epithelium, bone marrow, and those in lymphoid organs, and testes, are preferred target organ tissues for PAH effects. Signs of toxicity are generally not seen at doses less than those which produce a high tumor incidence.

30. Polychlorinated Biphenyls (PCB's) were found in the soils of the emergency containment pond in concentrations of 5.5 parts per million. PCBs are designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. PCB mixtures have been shown to induce liver cancer in mice and rats. PCB mixtures may have mutagenic potential. PCBs are extremely persistent in the environment and have been shown to be highly bioaccumulative in the food chain.

31. Arsenic was found at site 3 and 5 in the groundwater in concentrations from 20 to 2,000 ug/l. The National Interim Primary Drinking Water Standard for arsenic is 50 ug/l. Arsenic is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. Arsenic is a human carcinogen, causing increased incidences of skin and lung cancer in exposed populations. Other

effects include peripheral neuropathy and peripheral vascular disorders such as black foot which is seen in Taiwan in areas with high arsenic concentrations in the drinking water. Arsenic compounds have been shown to readily cross the placenta in humans and test mammals, causing fetal toxicity and malformations. Arsenic is highly toxic to fish and other aquatic life.

32. Hexavalent Chromium was found at sites 2 and 4 in the groundwater in concentrations ranging from 120 to 550 ug/l. Chromium is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. Hexavalent Chromium is generally recognized as the more toxic form of chromium. The Ambient Water Quality Criterion recommended for hexavalent chromium is 50 ug/l, which is identical to the National Interim Primary Drinking Water Standard. 45 FR 79331. The primary adverse effects seen from acute overexposures to chromium are to the kidney, as tubular necrosis.

33. Toluene was found at sites 1, 4 and 5 in the groundwater at concentrations from 610 to 40,000 ug/l. Toluene is toxic to laboratory animals and to fish and has been designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. For the protection of human health from the toxic properties of toluene ingested

through water and contaminated aquatic organisms, the Ambient Water Quality Criterion has been determined to be 14.3 mg/l. 45 FR 79340.

34. Xylene was found at sites 4 and 5 in the groundwater in concentrations of 400 to 60,000 ug/l. Occupational exposure to xylene has resulted in immunological disorders and menstrual problems in females. Xylene has also been associated with an increased incidence of cleft palate in offspring of rats which were exposed to orally administered xylene during pregnancy. Xylene is toxic to fish.

35. Lead was found in the groundwater at sites 1 and 4 in concentrations of 120 to 200 ug/l. Lead is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. The Ambient Water Quality Criterion for lead is identical to the existing drinking water standard which is 50 ug/l. 45 Fed. Reg. 79336. Some toxic effects associated with lead poisoning in humans include anemia, severe intestinal cramps, impaired motor and psychomotor function, paralysis, anorexia, and fatigue. Permanent nerve damage occurs in children with acute encephalopathic lead poisoning in at least 25% of the cases. Chronic exposures to lead have been reported to inhibit hemoglobin synthesis. Women are reported to be more suseptible to the toxic effects

of lead than men, especially the central nervous system effects. Lead is toxic to aquatic life.

36. Mercury was found at site 6 in the groundwater in concentrations ranging from 1,600 to 7,500 ug/l. Mercury is designated as a toxic pollutant under § 307(a)(1) of the Clean Water Act. 43 Fed. Reg. 4108. For the protection of human health from the toxic properties of mercury ingested through water and contaminated aquatic organisms, the Ambient Water Quality Criterion is determined to be 0.144 ug/l. 45 Fed. Reg. 79337. Mercury is toxic to humans. The National Interim Primary Drinking Water Standard for mercury is 2 ug/l. Mercury is corrosive to the skin and mucous membranes. The kidney is the major target organ following inhalation of elemental mercury. Mercury causes central nervous system damage and accumulates in nerve tissue.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT

37. The preceding paragraphs of this Complaint are incorporated by reference.

38. Some of the chemical wastes which contaminate the soils, groundwater and surface water of the North and South Works are hazardous substances as defined in § 101 of CERCLA, 42 USC 9601.

39. Hazardous substances are presently being released or threaten to be released from the North and South Works within the meaning of "release" as defined in § 101 of CERCLA.

40. The North and South Works are a facility as that term is defined in § 101 of CERCLA.

41. BASF is the owner and operator of a facility from which there is a release, or a threatened release, of a hazardous substance.

42. BASF owned or operated the North and South Works at the time of disposal of the hazardous substances on those sites.

43. The waters of the Trenton Channel, the Detroit River, and Lake Erie, as well as the aquatic life therein and the underlying lands, are natural resources managed and controlled by the State of Michigan in the public trust.

44. The groundwaters under the North and South Works are natural resources managed and controlled by the State of Michigan in the public trust.

45. The disposal of hazardous substances at the North and South Works has injured, destroyed, and caused the loss of natural resources owned, managed or controlled by the Sta

of Michigan in the public trust and has necessitated remedial action by the State of Michigan.

46. To assess the releases and threatened releases of hazardous substances from the North and South Works, the State has incurred and continues to incur substantial expenses and response costs.

47. § 107 of CERCLA, 42 USC § 9607, provides in pertinent part as follows:

> "(a) Notwithstanding any other provision or rule of law,...
>
> (1) The owner and operator of...a facility,
>
> (2) Any person who at the time of disposal of any hazardous substance owned or operated any facility at which hazardous substances were disposed of,
>
> (3) Any person who by contract, agreement, or otherwise arranged for disposal...of hazardous substances owned or possessed by... any other party or entity, at any facility owned or operated by another party or entity..., and
>
> (4) Any person who accepts or accepted any hazardous substances for transport to disposal...facilities or sites selected by such person, from which there is a release, or a threatened release which causes the incurrence of response costs, of a hazardous substance; shall be liable for
>
> (A) All costs of removal or remedial action incurred by the United States government or a State not inconsistent with the national contingency plan;

> (B) Any other necessary costs of response incurred by any other person consistent with the national contingency plan; and
>
> (C) Damage for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction or loss resulting from such release."

BASF is liable for all damages sought by Plaintiffs in this action under CERCLA.

RESOURCE CONSERVATION AND RECOVERY ACT

48. The preceding paragraphs of this Complaint are incorporated by reference.

49. The State is a person under § 1004 of RCRA, 42 USC 6903 and is entitled to sue pursuant to 42 USC § 6972.

50. Some of the chemicals contaminating the soils, groundwater and surface water of the North and South Works are hazardous wastes as defined in 42 USC § 6903.

51. BASF used the North and South Works for the disposal of hazardous wastes; the term "disposal" is defined in 42 USC § 6903.

52. The North and South Works has been operated by BASF as a facility for disposal of hazardous substances,

without a permit, in violation of 42 USC § 6925, and without notification to the administrator, in violation of 42 USC § 6930.

53. The unlawful disposal by BASF of hazardous wastes on the North and South Works presents an imminent and substantial endangerment to health and the environment.

MICHIGAN WATER RESOURCES COMMISSION ACT, 1929 PA 245, MCL 323.1 et seq, MSA 3.521 et seq.

54. The preceding paragraphs of this Complaint are incorporated by reference.

55. BASF's disposal of chemical wastes and the resulting contamination of the waters on and under the North and South Works and the Trenton Channel of the Detroit River are in violation of a § 6 of the Water Resources Commission Act which provides in part as follows:

> "It shall be unlawful for any persons directly or indirectly to discharge into the waters of the state any substance which is or may become injurious to the public health, safety or welfare; or which is or may become injurious to domestic, commercial, industrial, agricultural, recreational, or other uses which are being or may be made of such waters; or which is or may become injurious to the value or utility of riparian lands; or which is or may become injurious to livestock, wild animals, birds,

> fish, aquatic life, or plants or the growth or propagation thereof be prevented or injuriously affected; or whereby the value of fish and game is or may be destroyed or impaired."

56. BASF's disposal of chemical wastes and the resulting contamination of the waters on and under the North and South Works and the Trenton Channel of the Detroit River were without permit and are in violation of § 7 of the Water Resources Commission Act which provides in part as follows:

> "After April 15, 1973, a person shall not discharge any waste or waste effluent into the waters of this state unless he is in possession of a valid permit therefor from the commission."

57. Pursuant to § 10 of the Water Resources Commission Act, Plaintiffs are entitled to relief from violations thereof, including recovery of the full value of the injuries done to the natural resources of the State and the costs of surveillance and enforcement by the State resulting from the violation; Plaintiffs are also entitled to injunctive relief to restrain violations and to require compliance with the Act, and civil penalties of not more than Ten Thousand Dollars ($10,000.00) per day for each violation.

MICHIGAN ENVIRONMENTAL PROTECTION ACT (MEPA) 1970 PA 127, MCL 691.1201 ET SEQ; MSA 14.528(201).

58. The preceding paragraphs of this Complaint are incorporated by reference.

59. In Const 1963, Article 4, §§ 51 and 52, the people of the State of Michigan have commanded:

> "Sec. 51. The public health and general welfare of the people of the state are hereby declared to be matters of primary public concern. The legislature shall pass suitable laws for the protection and promotion of the public health."
>
> Sec. 52. The conservation and development of the natural resources of the state are hereby declared to be of paramount public concern in the interest of the health, safety and general welfare of the people. The legislature shall provide for the protection of the air, water and other natural resources of the state from pollution, impairment and destruction."

60. In response to that charge, the Michigan Legislature enacted the Thomas J. Anderson, Gordon Rockwell Environmental Protection Act, 1970 PA 127, supra, "for the protection of the air, water and other natural resources and the public trust."

61. Plaintiffs are entitled to maintain this action under § 2 of MEPA, MCL 691.1202; MSA 14.528(202).

62. This Court may grant equitable and other relief required to protect the air, water and other natural resources or the public trust therein from pollution, impairment or destruction pursuant to § 4 of MEPA, MCL 691.1024; MSA 14.528(204).

63. MEPA imposes a duty on BASF to prevent or minimize degradation of the environment.

64. BASF has failed to monitor, safeguard, contain or remove the hazardous substances so as to prevent their release from the North and South Works.

65. BASF's disposal of chemical wastes and the resulting contamination of the waters on and under the North and South Works and the Trenton Channel of the Detroit River constitute a violation of the policy enunciated in Constitution 1963, Article 4, §§ 51 and 52 and a violation of the provisions of MEPA, supra; and are in violation of Defendant's duty to prevent or minimize harm to the environment. Equitable action is therefore necessary to prevent pollution, impairment, and destruction of the water resources of the State of Michigan.

COMMON LAW NUISANCE

66. The preceding paragraphs of this Complaint are incorporated by reference.

67. BASF's disposal of chemical wastes and the resulting contamination of the waters on and under the North and South Works and the Trenton Channel of the Detroit River constitute a public nuisance which injures and continues to threaten the natural resources and the health, safety, and welfare of the people of the State of Michigan.

VIOLATION OF THE PUBLIC TRUST

68. The preceding paragraphs of this Complaint are incorporated by reference.

69. The surface waters of the Trenton Channel of the Detroit River, the Detroit River and Lake Erie, the lands underlying such waters, and the fish and aquatic organisms contained therein, are natural resources within the public trust.

70. The groundwaters of the State of Michigan are natural resources within the public trust.

71. These Plaintiffs have the responsibility to ensure that the public trust is protected and to seek compensation for any diminution in the public trust corpus.

72. BASF's disposal of chemical wastes and the resulting contamination of the waters on and under the North and South Works and the Trenton Channel of the Detroit River, constitute a continuing impairment of the public trust.

UNJUST ENRICHMENT

73. The preceding paragraphs of this Complaint are incorporated by reference.

74. BASF was unjustly enriched and shifted its cost of doing business onto the people of the State of Michigan by unlawfully disposing of chemical wastes on and under the North and South Works.

75. These Plaintiffs are entitled to restitution to the extent that Defendant was unjustly enriched by unlawfully disposing of chemical wastes on and under the North and South Works.

RELIEF

WHEREFORE, Plaintiffs request this Honorable Court to provide the following relief:

A. Issue an Order immediately enjoining Defendant from allowing or causing the disposal or discharge of any hazardous waste into the ground, groundwater, and surface water on, under, and adjoining the North and South Works;

B. Issue an order immediately enjoining Defendant from altering any part of the North and South Works without the approval of the DNR;

C. Issue an Order directing the Defendant to prevent the further spread of hazardous waste into the Trenton Channel of the Detroit River from the North and South Works by accomplishing measures, according to a plan and schedule submitted to the DNR for its approval within fifteen (15) days of the entry of the order of the Court;

D. Issue an Order directing the Defendant to abate hazardous waste soil contamination on the North and South Works by accomplishing measures, including the following, according to a plan and time schedule developed by a qualified consultant and submitted to the DNR for its approval within thirty (30) days of the entry of the order of the Court:

1) identification of all areas used by Defendant for the disposal of chemical and industrial wastes, or those sites where chemical products or wastes were spilled or lost to the soil, groundwater or surface water, on and near the North and South Works, and the character and quantities of all chemical and industrial wastes disposed of at those areas;

2) excavation of all buried hazardous wastes from the identified areas;

3) determination of the extent of contamination of soil, surface water, and/or groundwater at the North and South Works with hazardous wastes;

4) excavation of soil to the extent determined necessary by DNR;

5) handling, repackaging, transportation, and disposal of excavated hazardous wastes and soil in an environmentally sound manner approved by DNR;

E. Issue an Order directing the Defendant to repair and clean up the groundwater contaminated with hazardous wastes placed on the North and South Works according to a plan and schedule developed by a qualified consultant and submitted to DNR for its approval within thirty (30) days of the entry of the order of the Court. The consultant's plan and schedule shall be based upon a study by it which includes, but is not limited to, investigation of the following:

1) the nature and extent, both vertically and horizontally, of groundwater contamination with hazardous wastes under and surrounding the North and South Works;

2) groundwater flow, velocity, and direction;

3) the various waterbearing strata and the extent of their contamination;

4) proper location of monitoring wells;

5) remedial measures, including, but not limited to, the construction of a DNR-approved system for the collection, treatment, and removal/disposal of any collected surface or groundwater contaminated with hazardous wastes.

F. Issue an Order directing the Defendant to repair and clean up the parts of the Trenton Channel of the Detroit River which are contaminated with hazardous wastes placed on the North and South Works, according to a plan and schedule submitted to DNR for its approval within ninety (90) days of the entry of the order of the Court, such plan and schedule to be based upon a monitoring and sampling study of water, sediments, and aquatic species in the Trenton Channel;

G. Issue an Order directing the Defendant to report weekly to DNR, in writing, on the progress of all studies, data collected, and remedial actions listed above;

H. Issue an Order directing the Defendant to permit the Plaintiffs, their agents and contractors, to enter and inspect the North and South Works, to monitor remedial activities, to take samples of soil, groundwater, surface water, and chemical wastes at the site, and to undertake any other necessary activity related to the clean-up of hazardous wastes from the site;

I. Issue an Order directing the Defendant to record a notation on the deed to the North and South Works or on any other instrument normally examined during a title search that will notify the public that the site has been used as a hazardous chemical and industrial waste dump and that its future use is restricted to activities that will not disturb the integrity of the final cover, or any containment system;

J. Issue an Order directing the Defendant to immediately obtain a bond of one million dollars ($1,000,000.00) against insolvency to insure that funds will be available to finance measures ordered in Paragraphs A through F.

K. Issue an Order directing Defendant to reimburse Plaintiffs for all expenses incurred by Plaintiffs during the investigation of the contamination originating from Defendant's property;

L. Impose a civil penalty upon Defendant of ten thousand dollars ($10,000.00) for each day of its pollution, impairment, and destruction of the environment;

M. Issue an Order directing Defendant to pay damages in whatever amount Plaintiffs are found entitled to compensate the people and the State of Michigan for the pollution, impairment and destruction of the environment and the injury to the natural resources caused by Defendant's discharge of hazardous and toxic substances into the waters of this State;

N. Award Plaintiffs attorney fees and all costs of this action, including the costs of salaries paid State employees for the investigation and enforcement of this litigation;

O. Issue an Order directing Defendant and its agents and employees, to scrupulously comply with all federal and state statutes, rules and regulations, and orders and permits governing its operations;

P. Enter judgment against Defendant requiring it to reimburse Plaintiffs for:

a. All past, present and future damages to the groundwater, the Detroit River, and other natural resources of the State, resulting from contamination on and emanating from the North and South Works; and

b. All costs and expenses incurred or to be incurred by the State for its response, including costs of removal or remedial action, to contamination on and emanating from the North and South Works.

Q. That this Court retain jurisdiction in this matter until such time as all remedial measures have been effectuated and for a suitable monitoring period thereafter; and

R. Any other relief as the Court shall deem equitable, proper and just.

Respectfully submitted,

FRANK J. KELLEY
Attorney General

Stewart H. Freeman
Assistant Attorney General
In Charge

Stephen F. Schuesler
Assistant Attorney General
Environmental Protection Division
720 Law Building
Lansing, MI 48913
(517) 373-7780

Dated: OCT 31 1983

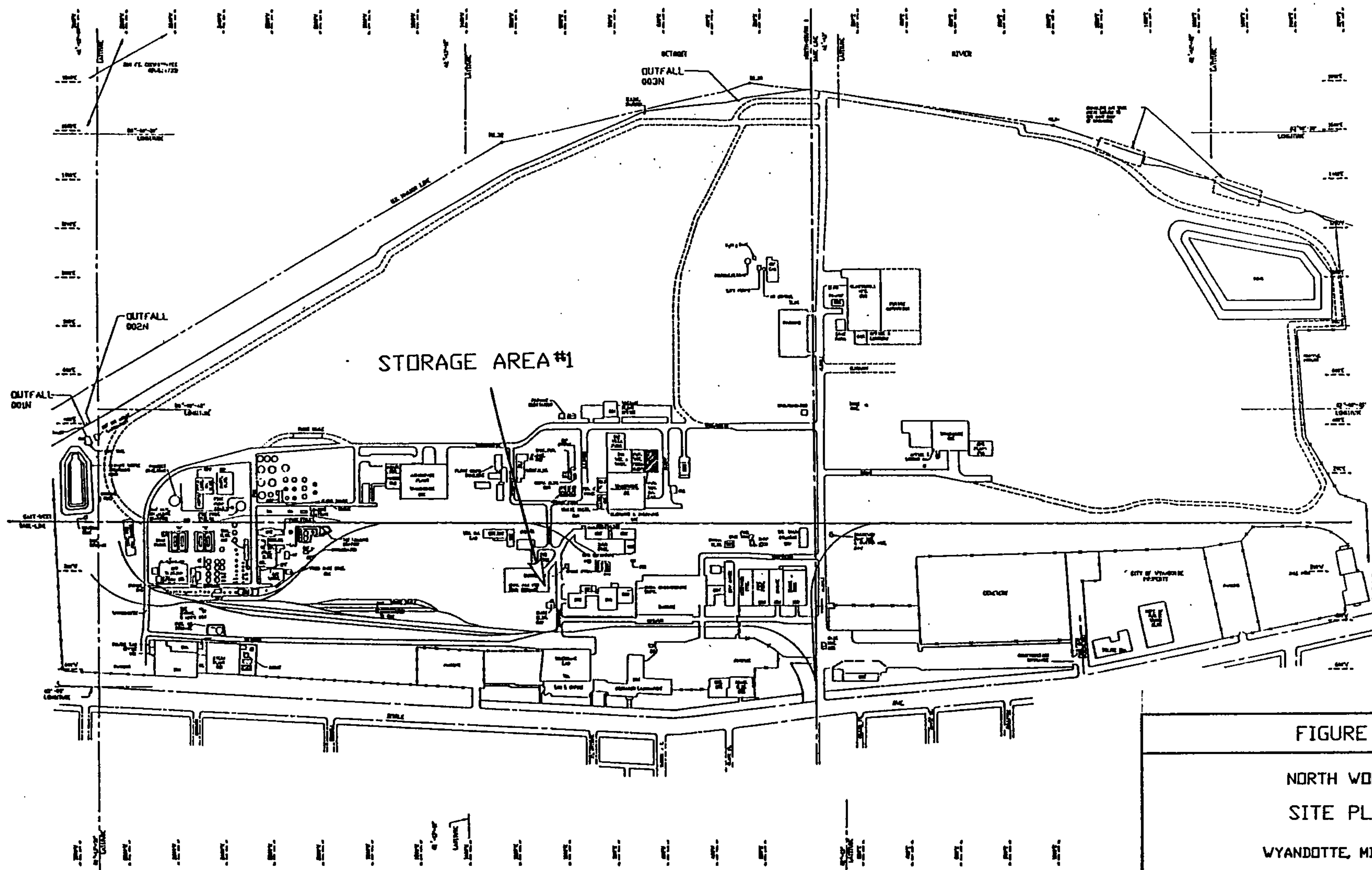


FIGURE I

NORTH WORKS

SITE PLAN

WYANDOTTE, MICHIGAN

BASF Corporation

33364

COUNTY OF WAYNE ASSESSMENT ROLL FOR THE CITY

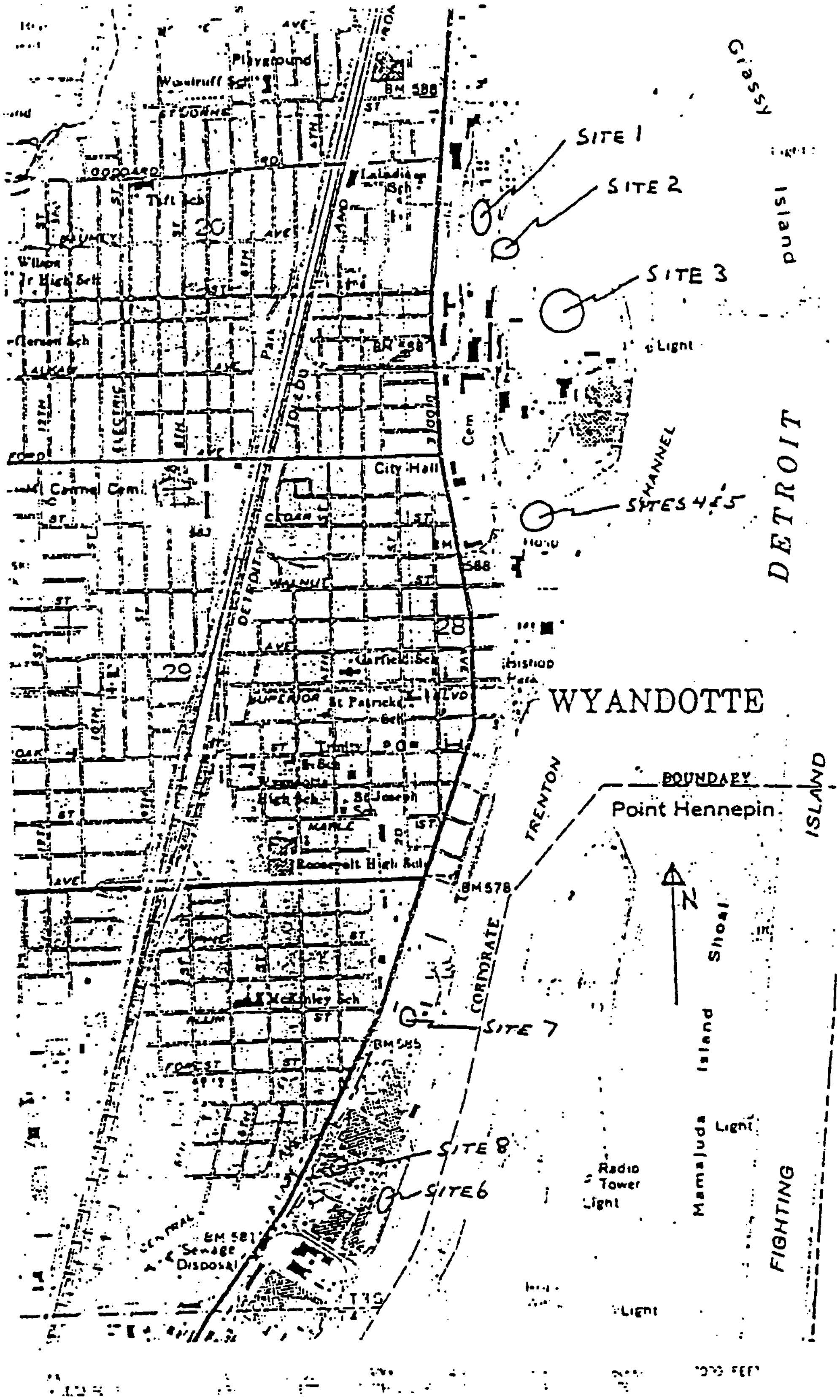
PROPERTY NUMBER / TAXPAYER	DESCRIPTION
DP = 077 57 023 99 0001 000 L S F WYANDOTTE CORP 09 BIDDLE AVE WYANDOTTE MI 48192	04925 PART OF SE 1/4 FRAC SEC 32 T3S R11E. BEG AT INT OF CEN LINE OF GROVE ST 80FT WIDE WITH ELY LINE OF BIDDLE AVE 120FT WIDE TH ELY 35.79FT TH NLY 703.3FT TH S64DEG 58M 19S E 827.5FT TH S16DEG 08M 36S W APPROX 1801FT TH S31DEG 25M W APPROX 830FT TH N54DEG 49M W1173.68FT TH N 34DEG 07M E 404.56FT TH N15DEG 19M E APPROX 797FT TH ALONG A CURVE CONCAVE TO SE ARC 454.02FT RAD 4750.71FT POB EXC THEREOF 2.65 AC OF WYANDOTTE TERM RR ROW 59.44 AC K 59.44
57 008 99 0005 000 [illegible]TE CORP TAX [illegible]LL RD [illegible]NJ 07054	16258 PT OF FRAC SEC 21 AND 28 T3S R11E DESC AS BEG AT INTER OF N LINE OF FORD AVE 66FT WD AND BIDDLE AVE 120FT WD TH NLY ALONG E LINE OF BIDDLE TO S LINE OF PERRY PLACE 50FT WD TH ELY ALONG S LINE OF PERRY PLACE TO U.S. HARBOR LINE TH S29DEG 51M 7S E 2161FT TH S13DEG 16M 34S E 1045.30FT TH S80DEG 20M 36S W 1244.80FT TH S13DEG 52M 59S W 1220FT MORE OR LESS TH S85DEG 10M 25S W 446.09FT TH N1DEG 31M 34S W 206.43FT TH S88DEG 28M 26S W 429.88FT TH S50DEG 29M 19S W 274.58FT TH S12DEG 29M 56S W 127.07FT TH WLY 440.32FT TO E LINE OF BIDDLE AVE TH N11DEG 17M 56S W 610.84FT TH N79DEG 42M 05S E 365.06FT TH N1DEG 08M 36S W 1132.59FT TH S89DEG 51M 24S W 362FT TH S1DEG 08M 36S E 605FT TH WLY 124.24FT TO POB EXC LAND USED BY W.T.R.R. 233.15 AC K233.15 K 233.15

(4)

(6)

(94)

EXHIBIT 3



BASF Wyandotte Corporation
Site Locations

EXHIBIT B

TABLE 1
MDNR - ORGANIC/INORGANIC WATER SAMPLE ANALYSES
BASF WYANDOTTE NORTH AND SOUTH WORKS
Wyandotte, Michigan

Parameter (ug/l)		Site #1	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8
Styrene		730				45			
Benzene		920	13		1100->200,000	2300			
Toluene		1900-8000			40,000	610			
Xylene					750-60,000	400			
HCB		0.29			0.25			0.13-29	0.48
Naphthalene					21			1300	
Phenanthrene								170	
Fluorene								400	
CHCl=CHCl								4-20,000	
TCE								2->50,000	
CH_2Cl-CH_2Cl-CH_3							TR	TR-260	
$CHCl_3$		4-100							31
PCE								15,000	
HCBD		0.10						0.15-380	0.15
DISS	CR	<50	<50-550	<50	120-250	<50	<50	<50	<50
	CU	<20	100	50-300	<50	<50	20	<20-430	<20-25
	NI	<50	<50	<50	70-100	<50	130-650	<50-60	<50
	PB	<50-60	<50	<50	160-200	<50	<50	<50-110	<50
	ZN	<50-3900	1400	430	180-4400	<50	1100	190-3100	50-390
	CD	<20	<20	<20	<20	<50	<20	<20	<50
	Hg	<1					1600-7500	<1	<1
	CA	23-340		85					
	MG	<1-9		4					
	NA	27-160		4800					
	K	<1.9-190		350					
	FE	<100-200		<100-4300	18,000-22,000				
Phenol		7NA-8NA	32NA-240NA	2NA-660NA			150PT-310PT	10NA-170PT	3NA-16NA

NA - Analytical method not approved by lab.
PT - Preservation Technique not used.
TR - Trace present.

EXHIBIT C

TABLE 2
MDNR - ORGANIC/INORGANIC SEDIMENT ANALYSES
BASF WYANDOTTE NORTH AND SOUTH WORKS
Wyandotte, Michigan

	Parameter	Site #1	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8
ug/l	Naphthalene				550				
	Anthracene				10			70	
	Phenanthrene				37			420-21,000	
	HCB							780-430,000	
	Fluorene							48,000->109,000	
	Benzoanthrene							660	
	Pyrene							1100	
	HCBD							1200-800,000	
ug/kg	CD		<2	<2			<2	<2	<2
	CR		18	18			14-20	20	11
	CU		27	25			13-20	16	6
	NI		18	15			7-20	13	7
	PB		21	25			<5-40	<5	<5
	ZN		40	120			10-60	6	15
	HG						<5-16	<	<.5

TABLE 3
U.S. EPA INORGANIC CHEMICALS
BASF WYANDOTTE
Wyandotte, Michigan
Water

Parameter	Site #1	Site #3	Site #5	Site #7	Site #6
Aluminum	750	8100-15,900	800	1800	
Chromium	<10	<20-30	<10	<10	
Barium	120	20	90	2110	
Beryllium	<2	<4-2	<2	<2	
Cadmium	<5	<10	<5	<5	
Cobalt	<10	<20-40	<10	<10	
Copper	<20	200-380	40	40	
Iron	440	4120-5140	11,040	13,000	
Lead	120	<80-80	<40	<40	
Nickel	<20	20-220	<20	<20	
Manganese	<10	90-120	160	70	
Zinc	5520	440-4040	2650	4120	
Boron	30	40-500	920	150	
Vanadium	<10	180-1430	<10	<10	
Calcium	255,000	22,300-37,000	914,000	21,600,000	
Magnesium	200	2900-2920	754,000	1400	
Sodium	137,000	3,640,000-19,200,000	6,240,000	12,300,000	
Arsenic	<10	9.2-2000	20	<100	
Antimony	<20	<20	<20	<20	
Selenium	<10	<100	<400	<400	
Thallium	<10	<10	<400	<100	
Mercury	<1	<1	<1	<1	300-2000
Tin	<20	*	<20	<20	
Silver	<20	<40	<20	<20	
Cyanide	0.09	2.2-8.7	0.26	--	
Organic Mercury				<10	100-5000

*Interference

TABLE 4
U.S. EPA ORGANIC CHEMICALS
BASF WYANDOTTE
Groundwater

Parameter (ug/l)	Site #1	Site #2	Site #3	Site #4	Site #5	Site #6	Background Well for Site #7	Site #7	Polyol Pond
2,4-dimethyphenol	4400								
phenol	120		175	260		25		51-65	
naphthalene	12	120		520					
benzene	160-930	16		1100	1100				
ethylbenzene	11-34			12	12				
toluene	>1000-2300			750	750				
1,2 dichloropropane	12							13	
acenaphthene		26							
fluoranthene		23							
benzo(a)anthracene		22							
benzo(a)pyrene		14							
3,4 benzofluoranthene		13							
benzo(k)fluoranthene		13							
chrysene		22							
anthracene		44							
fluorene		20							
phenanthrene		44							
pyrene		17							
bis (2-ethylhexyl phthalate						19			1.0
bis (2-chloroisopropyl ether			280						
1,2 dichloroethane								12	
chloroform								19	
1,1-dichloroethylene								2600	
1,2-trans-dichloroethylene								29,000	
methylene chloride									
tetrachloroethylene								19,000	
trichloroethylene								320,000	
vinyl chloride								890	
2-nitrophenol			29			45			
4-nitrophenol			61			130			
hexachlorobenzene								140-150	
hexachlorobutadiene								220-240	

TABLE 5
U.S. EPA ORGANIC CHEMICALS
SOILS ON SITE
BASF WYANDOTTE NORTH AND SOUTH WORKS
Wyandotte, Michigan

Parameter (ug/g)	Site #3	Emergency Containment Pond	Drum Pad Site (ppm)
bis (2-ethylhexyl) phthalate	ND	12	4.6
d-n-butyl phthalate	ND	48-93	
toluene	ND	9.8-15	
PCB-1242		5.5	
bis-(2-chloroisopropyl ether)	ND	99	
methylene chloride	ND	1,3-5.0	940
fluchloralin			
trifuralin	ND		7
phenanthrene/anthracene	ND		32
fluolanthene/pyrene	ND		47.2
chrysene/benzo(a)anthracene	ND		2.7
benzo(a)pyrene	ND		
nitrosamines	ND		
toxaphene		0.40	

ID: Insufficient Data
NAD: No Available Data

Chemical Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Styrene	100-42-5	yes	oral rat 1000-5000 mg/kg inhal. mouse LC_{50} 11,800-21,000 mg/m^3	96 hr LC_{50} fish 25-65 mg/l 48 hr EC_{50} Daphnia 23 mg/l	Potential Animal	ID	Potential	Neurological & physical disturbances; embryo toxicity	
Benzene	71-43-2	yes	oral 3000-5700 mg/kg	96 hr LC_{50} Juvenile Rainbow trout 5.3 mg/l 48 hr EC_{50} 265 mg/l	Human Positive	Confirmed via inhalation	ID	Affects blood forming organs w/resulting blood disorders; neurol. disorders; embryo toxicity	Calculated BCF: 5.21
Hexachlorobenzene	118-74-1	yes	oral 1700-10,000 mg/kg	96 hr LC_{50} fish 2.3-22 mg/l	Animal Positive	ID	ID	Kidney & ovarian follicle degeneration	Does not degrade in the environ. S.S. BCF: 22,000
Chloroform	67-66-3	yes	oral 120-1750 mg/kg inhal. LC_{50} 28,000 ug/l	96 hr LC_{50} fish 15.1-75.0 mg/l 48 hr EC_{50} Daphnia 28.9 mg/l	Animal Positive	Potential via inhalation - ID via oral	ID	Liver & kidney damage by chronic exposures	S.S. BCF: 6
Tetrachloroethylene	127-18-5	yes	oral rat 4460 mg/kg inhal. LC_{50} 35,000 mg/m^3	96 hr LC_{50} fish 4.8-18.4 mg/l 48 hr EC_{50} Daphnia 18 mg/l	Potential Animal	ID	ID	Liver toxin Kidney damage	BCF: 49
Hexachlorobutadiene	87-68-3	yes	oral 64-350 mg/kg dermal 1206-4330 mg/kg	96 hr LC_{50} fish 0.09-0.32 mg/l	Potential Animal	ID	ID	Kidney damage	Adsorbs to soil & humus particles in water

ID: Insufficient Data
NAD: No Available Data

Chemical Name	CAS #	CHR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Bis (2-ethylhexyl) phthalate	117-81-7	yes	oral 30,600-33,900 mg/kg	48 hr EC_{50} Daphnia 11 mg/l	Animal Positive	Potential	ID	Testicular damage; liver & kidney effects	
Trichloroethylene	79-01-6	yes	oral 2800-5900 mg/kg inhal. LC_{50} 42,960-263,000 mg/m^3	96 hr LC_{50} fish 4.8-18.4 mg/l 48 hr EC_{50} Daphnia 8.5-17.7 mg/l	Potential Animal	ID	ID	CNS depression; liver & kidney damage	Rapidly volatilized from water, photo-oxidizes in atmos.
Vinyl Chloride	75-01-4	yes	oral rat 500 mg/kg	ID	Human Carcinogen	ID	Potential	Kidney damage; embryo toxicity via inhalation	Highly volatile in wtr; hydrolyzes then decomposes in atmos.
Methylene Chloride	75-09-2	no	oral 2000-2136 mg/kg inhal. LC_{50} 15,000 ppm	96 hr LC_{50} fish 193-224 mg/l 48 hr EC_{50} Daphnia 224 mg/l	Potential Animal	ID	Potential	Elevated carboxyhemoglobin in blood; central nervous system depression	Volatiliz. from wtr with photodegradation
1,2-Dichloroethane	107-06-2	yes	oral 965 mg/kg dermal 4620 mg/kg inhal. LC_{50} 4050-48,600 mg/m^3	96 hr LC_{50} fish 118-550 mg/l 48 hr EC_{50} Daphnia 218 mg/l	Animal Positive	ID	Potential	Blood clotting disorders; liver & kidney damage	
Toxaphene	8001-35-2	yes	oral 80-90 mg/kg dermal 1075 mg/kg inhal. LC_{50} 20 mg/m^3 (2 hr)	96 hr LC_{50} fish all <1.0 mg/l	Animal Positive	ID	Potential	Liver damage; toxic to dams during pregnancy	Half-life in soil 4-13 yrs. BCF: 20,7[illegible]

ID: Insufficient Data
NAD: No Available Data

C. .cal Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Benzo(a) pyrene	50-32-8	no	ID	ID	Animal Positive	ID	Potential	Damage to regenerative tissues	
Benzo(a) anthracene	56-55-3	no	ID	ID		ID	ID	Damage to regenerative tissue	
Cadmium	7440-43-9	yes	oral 175-225 mg/kg	for various salts 96 hr LC_{50} fish <1.0 mg/l	ID	ID	ID	Kidney is the target organ for toxicity	
-senic	7440-38-2	yes	oral Arsenate (V) rats & mice approx. 100 mg/kg oral Arsenate (III) rats & mice approx 10 mg/kg	96 hr LC_{50} fish 13.3-42 mg/l	Human Carcinogen	Potential	Potential	Peripheral vascular & neurological disorders; hyper-pigmentation & keratoses	
Chromium	7440-47-3	yes	Varies due to chemical state	Hexavalent 96 hr LC_{50} fish 37-133 mg/l	Carcino-genic via inhalation	ID	(Hex) Potential (Tri) ID		
Beryllium	7440-41-7	yes	oral mice & rats approx 100 mg/kg as fluoride	96 hr LC_{50} fish (soft water) <1.0 mg/l	Animal Car-cinogen via inhal.; limited human data	ID	ID	Lung disease	
Nickel	7440-02-1	yes	oral (acetate) 350-410 mg/l (nitrate) 1620 mg/kg	96 hr LC_{50} fish (soft) 1-10 mg/l (hard) 10-100 mg/l	Animal Car-cinogen via inhal.; human nasal & lung carcinogen	ID	ID	Dermatitis; inhibits sperma-togenesis; lung damage	

ID: Insufficient Data
NAD: No Available Data

Chemical Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Toluene	108-88-3	yes	oral rat 2598-7530 mg/kg dermal rabbit 12,200 mg/kg	96 hr LC_{50} fish 6.4-22.8 mg/l	ID	ID	ID	Dermatitis; decreased growth rate; narcotic	BCF: 10.7 (est)
Xylene	1330-20-7	yes	oral rat 1600-8600 mg/kg inhal rat LC_{50} 29500-28000 mg/m^3	96 hr LC_{50} fish 21-37 mg/l	NAD	Potential	ID	Tissue irritant/ dermatitis; menstrual disorders; liver & lung effects	
Naphthalene	91-20-3	no	oral rat 1100-2400 mg/kg dermal rat >2500 mg/kg	96 hr LC_{50} Salmon 1.37-1.84 mg/l 48 hr EC_{50} Daphnia 8.6 mg/l	ID	ID	ID	Cataract formation; alterations in blood cells; anemia; jaundice	BCF: [illegible].5 (est)
[illegible]-Dichloro-[illegible]	78-87-5	no	oral rat 1900-2200 mg/kg mouse 860 mg/kg dog 5000 mg/kg dermal rabbit 10,200 mg/kg	96 hr LC_{50} fish 139-320 mg/l 48 hr EC_{50} Daphnia 52.5 mg/l	ID	ID	ID	CNS disfunction; lung, liver, kidney damage	Half-life in water 7 days
Pyrene	129-00-0	no	oral mouse 9400 mg/kg	NAD	ID	ID	ID	ID	S.S. BCF: 2600
Anthracene	120-12-7	no	ID	ID	ID	NAD	ID	NAD	Moves thru environ. by sorption; is degraded by microbes
Phenanthrene	85-01-8	no	oral mouse 700 mg/kg	96 hr LC_{50} fish <1-2 mg/l	ID	NAD	ID	ID	

ID: Insufficient Data
NAD: No Available Data

C' 'cal Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Di-n-butyl phthalate	84-74-2	yes	oral rat 23 g/kg dermal rabbit 20 ml/kg	96 hr LC_{50} fish 0.7-6.5 mg/l	ID	ID	ID	Testicular atrophy; liver & kidney lesions	Biodegrades in soil and water
Lead	7439-92-1	yes	NAD	96 LC_{50} fish (soft) 1-7.3 mg/l (hard) 471-482 mg/l	ID	ID	NAD	CNS changes; fetotoxic; affects blood forming organs	BCF: 49
Zinc	7440-66-6	yes	oral rat 350 mg/kg	96 hr LC_{50} fish 0.87-12.5 mg/l	ID	ID	ID	High chronic doses can cause bone demineralization, kidney damage	BCF: 47
Mercury	7439-97-6	yes	oral rat (Acetate) 76 mg/kg mouse 62 mg/kg mouse (chloride) 10 mg/kg	96 hr LC_{50} fish 0.024-0.280 mg/l	ID	Potential	ID	Neuronal damage; severe irreversible CNS effects	Bacterial action converts inorganic to more toxic organic form
Magnesium	7439-95-4	no	NAD	NAD	ID	ID	ID		
Copper	7440-50-8	yes	oral (chloride) rat 120 mg/kg (oxide) rat 470 mg/kg (sulfate) rat 300 mg/kg	(ion) 96 hr LC_{50} fish 0.43 mg/l (Acetate) 26 ppm	ID	ID	ID	Anorexia; jaundice; dermatitis	
Calcium	7440-70-2	no	NAD	NAD	NAD	NAD	NAD	Kidney stones	

ID: Insufficient Data
NAD: No Available Data

Chemical Name	CAS #	CMR Listed	Acute Toxicity		Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
			Terrestrial Life LD_{50}	Aquatic Data					
Potassium	7440-09-7	no	NAD	96 hr LC_{50} fish 80 ppm	NAD	NAD	NAD	Excessive tissue levels cause physiological disfunction	
Sodium	7440-23-5	no	NAD	NAD	NAD	NAD	NAD	Hypertension	
Iron	7439-89-6	no	Anhydrous ferric chloride oral 400-900 mg/kg	NAD	ID	NAD	NAD	Accumulation of pigments in lungs after inhal. exposures	
Fluchloralin	33245-39-5	yes	oral mouse 750 mg/kg rat 1550 mg/kg	96 hr LC_{50} fish 12-16 ug/l 48 hr EC_{50} Daphnia 129.2 ug/l	NAD	ID	NAD	NAD	Half-life in heavy soil 65 days
Bis(2-chloro isopropyl) ether	108-60-1	no	oral rat 240 mg/kg	NAD	ID	NAD	ID	Liver and kidney damage	BCF: 56.2
Fluorene	86-73-7	no	NAD	NAD	NAD	NAD	NAD	NAD	
Cis-trans-1,2-dichloroethylene	156-59-2 156-60-5	no	ID	trans- 96 hr LC_{50} fish 135 mg/l 48 hr EC_{50} Daphnia 218 mg/l	ID	ID	ID	ID	
2,4-Dimethylphenol	105-67-9	no	oral mouse 809 mg/kg oral rat 3200 mg/kg dermal mouse 1040 mg/kg	48 hr EC_{50} D. magna 2.12 mg/l 96 hr LC_{50} fish 7.8-16.8 mg/l	ID	NAD	NAD	Early life stage test w/fathead minnows = 2.2 ug/l (lethal)	BCF: 150 in bluegill; T 1/2 in bluegill = 1 day

ID: Insufficient Data
NAD: No Available Data

Chemical Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Phenol	108-95-2	no	oral rat 340-530 mg/kg dermal rat 670-2500 mg/kg human lethal doses 140-430 mg/kg other animals oral 100-600 mg/kg	LC_{50} D. magna 91-100 mg/l 96 hr LC_{50} rainbow trout 5-11.6 mg/l fathead minnow LC_{50} 24-67.5 mg/l bluegill LC_{50} 1.5-28 mg/l	ID ID	NAD NAD	ID ID	Early life stage test in fathead minnows = 2.6 mg/l (lethal)	Not persistent; readily biodegraded
Ethylbenzene	100-41-4	no	oral rat 3500, 4728 mg/kg skin rabbit 15,415 mg/kg inhal. rat 4000 ppm (4 hrs)	48 hr EC_{50} D. magna = 75 mg/l 96 hr LC_{50} goldfish = 94.4 mg/l 96 hr LC_{50} fathead minnow = 45.3 mg/l 96 hr LC_{50} bluegill	NAD	NAD	NAD	Kidney & liver effects; skin irritation; dermatitis	Calculated BCF: 37.5 (AWQC)
Fluoranthene	206-44-0	no	oral rat 2000 mg/kg dermal rat 3180 mg/kg (24 hr contact)	48 hr EC_{50} D. magna = 325 mg/l 96 hr LC_{50} bluegill = 3.98 mg/l	Cocarcinogen	NAD	ID		Calculated BCF: 1,150 (AWQC)
3,4-Benzofluoranthene	205-99-2	no	NAD	NAD	Potential Animal Carcinogen	NAD	NAD	Tumors	Estimated steady state BCF: 28,200
Chrysene	218-01-9	no	NAD	NAD	ID	NAD	ID	Tumors	BCF: 11,700
1,1-Dichloroethylene	75-35-4	no	oral rat 1500-2500 mg/kg inhal. rat LC_{50} 4 hrs 500-15000 ppm oral mice 200 mg/kg	48 hr EC_{50} D. magna 11.6 and 79.0 mg/l	Suspect Carcinogen	ID	ID	Liver & kidney damage	NAD

ID: Insufficient Data
NAD: No Available Data

Chemical Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Acenaphthene	83-32-9	no	oral LD_{50} rat 10 g/kg oral LD_{50} mouse 2.1 g/kg	48 hr EC 50, D. magna = 41.2 mg/l 96 hr LC_{50} bluegill = 1.7 mg/l	NAD	NAD	NAD	Liver, kidney, lung, blood & glandular effects	Measured steady state BCF: 387
Benzo(k) Fluoranthene	207-08-9	no	NAD	NAD	Potential animal carcinogen	NAD	NAD	Tumors	Estimated steady state BCF: 28,200
2-Nitrophenol	88-75-5	no	oral rat 2830 mg/kg oral mouse 1300 mg/kg	NAD	NAD	NAD		Colitis, enteritis, gastritis, neuritis, spleen hyperplasm	NAD
4-Nitrophenol	100-02-07	no	oral rat 350 mg/kg oral mouse 470 mg/kg	LC_{50} D. magna 8,396 ug/l & 21,900 ug/l LC_{50} bluegill 8.280 ug/l LC_{50} fathead minnows 60,500 ug/l	ID	NAD	ID	Same as above	NAD
Antimony	7440-36-0	no	antimony tr. fluoride oral mouse 804 mg/kg	D. magna ant. potassium tatrate EC_{50} 9000 ug/l Fathead minnow, antimony trichloride LC_{50} 21,900 ug/l	ID	ID	ID		

ID: Insufficient Data
NAD: No Available Data

hemical Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Thallium	7440-28-0	no	minimum lethal does for humans 10-15 mg/kg Thallium Acetate rat oral 18-29 mg Tl/kg dog oral 10-20 mg Tl/kg rabbit oral 12-19 mg Tl/kg Thallic Oxide rat oral 9-20 mg Tl/kg dog oral 20-30 mg Tl/kg rabbit oral 10-30 mg Tl/kg	D. magna 48 hr EC_{50} = 2180 & 910 ug/l fathead minnow 96 hr LC_{50} = 1800 ug/l bluegill 96 hr LC_{50} = 132,000 & 121,000 ug/l	ID	ID	ID	Terrestrial life; hair loss & effects on nervous system	
Tin	7440-31-5	no	oral rat diethyl tin diiodide = 100 mg/kg dibutylin oxide = 45 mg/kg trimethyltin sulfate = 30 mg/kg triphenyltin chloride = 190 mg/kg	NAD	ID	ID	ID	ID	ID
Silver	7440-22-4	no	humans - ingestion of 10g silver nitrate is usually fatal; toxicity of silver compds is moderate	fathead minnow 3.9 ug/l rainbow trout 28 ug/l D. magna 0.25 ug/l	ID	ID	ID	In humans, argyria	Bioconc. of Ag in bluegill gills exposed to Ag nitrate for 28 days
Cyanide	7440-22-4	no	humans 1-3 mg/kg	freshwater fish 20-200 ug/l	NAD	NAD	NAD	No effects	NAD

ID: Insufficient Data
NAD: No Available Data

Chemical Name	CAS #	CMR Listed	Acute Toxicity: Terrestrial Life LD_{50}	Acute Toxicity: Aquatic Data	Carcinogen	Teratogen	Mutagen	Chronic Effects	Environmental Fate
Vanadium	7440-62-2	no	oral mouse 130 mg/kg for vanadium trioxide oral mouse 23 mg/kg for vanadium pentoxide & vanadium trichloride	NAD	NAD	NAD	NAD	Due to inhal.- acute inflammation of lung tissue & action on a variety of enzyme systems	NAD
Boron	7440-42-8	no	oral mouse 2000 mg/kg	NAD	NAD	NAD	NAD	NAD	NAD
Manganese	7439-96-5	no	low order of acute toxicity	NAD	NAD	NAD	NAD	Progressive deterioration of the CNS	NAD
Cobalt	7440-48-4	no	oral rat cobaltous oxide 1700 mgCo/kg oral mouse cobaltous oxide 800 mg/kg	NAD	NAD	NAD	NAD	Goiter, decreased thyroid function; increased heart rate; dermatitis; lung inflammation	NAD
Barium	7440-39-3	no	BaCl, oral, humans = 550-600 mg of barium (0.8-0.9g of BaCl)	NAD	NAD	NAD	NAD	Myeloid hyperplasm of spleen, liver & bone marrow; blood changes; stimulation of smooth muscle; paralysis of CNS	NAD
Aluminum	7429-90-5	no	relatively non-toxic	NAD	NAD	NAD	NAD	Retarded growth & metabolic disturbances in animals	NAD

APPENDIX D

1985 CONSENT DECREE

11/07/85

11/12/85R

UNITED STATES OF AMERICA
IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

FRANK J. KELLEY, Attorney General for the State of Michigan, ex rel MICHIGAN NATURAL RESOURCES COMMISSION, MICHIGAN WATER RESOURCES COMMISSION, and DR. RONALD SKOOG, Ph.D., Director of the Michigan Department of Natural Resources

Plaintiffs,

vs.

Civil Action
No. 83-CV-4712-DT

BASF WYANDOTTE CORPORATION,

Judge Avern Cohn
P-12030

Defendant.

CONSENT DECREE

The parties, Frank J. Kelley, Attorney General for the State of Michigan, Frank J. Kelley, <u>ex rel</u>. Michigan Natural Resources Commission, Michigan Water Resources Commission, and the Director of the Michigan Department of Natural Resources (hereinafter jointly referred to as "MDNR"), and BASF Wyandotte Corporation (hereinafter "BWC"), by their respective attorneys, having consented to the entry of this Consent Decree,

NOW, THEREFORE, before the taking of any testimony, upon the pleadings, and without admission or adjudication of any issue of fact or law herein, it is hereby ORDERED, ADJUDGED, AND DECREED as follows:

I. JURISDICTION

This Court has jurisdiction over the parties and subject matter of this action under 28 U.S.C. §1331, 42 U.S.C. §9613 and 42 U.S.C. §6972. This Court further has pendent jurisdiction of the parties and subject matter of this action with regard to claims under State of Michigan 1929 PA 245, as amended, MCL 323.1 et. seq., the Water Resources Commission Act, and 1970 PA 127, MCL 691.1201 et. seq., the Anderson-Rockwell Environmental Protection Act.

II. PARTIES BOUND

This Consent Decree shall apply to and be binding upon the parties to this Consent Decree, their officers, employees, agents, successors and assigns, and upon all persons, firms, subsidiaries and corporations acting under, through or for, or in active concert or participation with the parties in the performance of any obligations hereunder.

III. THE SITES

The property which is the subject of this Consent Decree (hereinafter "the Sites") is commonly referred to as the "North Works" and the "South Works" of BASF WYANDOTTE CORPORATION, and is located in the City of Wyandotte, Michigan. A description of the Sites appears in Appendix A.

IV. PURPOSE OF THIS CONSENT DECREE

It is the mutual intent and purpose of the parties that BWC shall, at its own and sole expense, control conditions at the Sites which could endanger public health, welfare, or the environment and take measures to prevent the flow of contaminated groundwater from the Sites to the Detroit River by undertaking the specific activities set forth in Section V of this Consent Decree.

V. REMEDIAL PROGRAMS

BWC shall accomplish programs of remedial action at the Sites, consisting of a site modification program, a monitoring program, and a maintenance program. The remedial action programs for the North and South Works are set forth in Appendix B and Appendix C attached hereto.

VI. DISCONTINUANCE OF OPERATION OF REMEDIAL ACTION PROGRAM

A. BWC shall give notice to MDNR of its intent to discontinue operation of any remedial program herein. Notice of BWC's intent to shut down any groundwater monitoring, collecting or treating system described by this document shall precede the shut down by at least sixty (60) days. MDNR shall respond affirmatively or negatively to such notice within sixty (60) days.

No remedial system within a particular area of the South Works may be discontinued prior to the expiration of thirty (30) years from the date of entry of this Decree unless BWC has given the notice described in this paragraph and can demonstrate that the required concentration levels of contaminants have been achieved in each well or drain comprising the system in that particular area and in each monitor well in the area served by the system for the required sampling period specified for that particular area; provided however, that if any remedial system on the South Works has not been certified operational pursuant to Paragraph IX.D. within eighteen (18) months of entry of this Consent Decree, the thirty (30) year period shall begin to run from the date that such system has been certified operational. If BWC wishes to discontinue collecting the groundwater at any individual extraction system within a particular remedial system on the South Works, the procedure set forth in Paragraph F.3. in Appendix C will control.

No extraction well system within a particular area of the North Works, nor the treatment system serving any such extraction well system, may be discontinued prior to thirty (30) years from the date that such systems become operational unless BWC has given such notice and can demonstrate that the required concentration levels of influent and effluent of the treatment system and in each monitor well in the area served by the extraction well system have been achieved for the required sampling period specified for that particular area. If BWC wishes to discontinue any individual wells within an extraction well system or treatment system on the North Works, the procedure set forth in Paragraph D of Appendix B will control.

A dispute by the parties regarding the adequacy of any demonstration under VI.A. shall be resolved by the Court. In the resolution of any such dispute, BWC shall bear the burden of persuasion by a preponderance of the evidence.

B. Before the operation of any remedial system is discontinued, MDNR may request that such system be modified, relocated or continued. BWC shall respond to such a request within sixty (60) days. Any disagreement by the parties regarding modification, relocation or continued operation of any system shall be resolved by the Court. Except as provided in VI.A., MDNR shall bear the burden of persuasion by a preponderance of the evidence that such modification, relocation and/or continued operation is necessary to protect the public health, welfare or the environment.

C. Where MDNR is requesting modification, relocation and/or operation of a remedial system beyond thirty (30) years from the date of entry of this Consent Decree, MDNR shall bear the burden of persuasion by a preponderance of the evidence that such modification, relocation and/or continued operation is necessary to protect the public health, welfare or the environment.

D. In the event of any dispute under this paragraph, no system shall be discontinued until ordered by the Court.

VII. APPROVALS; NOTICE OF DISAPPROVAL OR INADEQUACY

A. Approvals

Except as otherwise specifically provided in this Consent Decree or the Appendices, the approval of any proposed action, or of any certification, report, information or data submitted by BWC to MDNR pursuant to this Consent Decree, shall be effective either upon written notice to BWC or upon the expiration of a period of sixty (60) days from the receipt of notice of the proposed action or of such certification, report, information or data by MDNR, whichever shall occur earlier. This 60-day period may be extended upon agreement between BWC and MDNR.

B. Notice of Disapproval or Inadequacy

Except for those actions referred to in Section XII of the Consent Decree, in the event MDNR should disapprove or find inadequate any proposed action, or any certification, report, information, or data submitted by BWC under this Consent Decree, it shall provide written notice thereof to BWC within 60 days of receipt of a notice of a proposed action or of such certification, report, information or data, which notice shall include:

1. A detailed statement of the bases for MDNR's conclusion or request;

2. A description of what further action in its opinion is required to fulfill or effectuate any provisions of this Consent Decree, such description to include, without limitation, the need for verification of data or for obtaining additional data or for implementing specified actions; and

3. A proposed schedule for submission of any additional information.

It is the intent of the parties that this notice fully set forth and describe any disapproval or finding of inadequacy and the bases therefore; however, an insufficiency in the notice shall not be deemed a waiver by MDNR of any such disapproval or finding of inadequacy.

C. Submission to Court

In the event an agreement cannot be reached between BWC and MDNR concerning MDNR's disapproval or finding of inadequacy, BWC shall file a petition with the Court setting forth the matter in dispute. In any proceedings on such petition, BWC shall have the burden of persuasion by a preponderance of the evidence unless the burden of persuasion is assumed by MDNR under any other provision of this Consent Decree.

D. Resolution of Disputes During Course of Site Modification Program

In the event a dispute should arise between BWC and MDNR during construction of the Site Modification Program, BWC shall, upon demand by MDNR, stop construction and shall, unless the dispute is resolved, file a petition with the Court setting forth the matter in dispute.

VIII. DELAY IN PERFORMANCE

If any event occurs which delays or could delay the timely achievement of the requirements of this Consent Decree (including any delays resulting from the obtaining of any necessary permits), BWC shall notify MDNR within three days in writing of the delay or anticipated delay as appropriate, describing in detail the anticipated length of the delay, the cause or causes of delay, the measures taken and to be taken by BWC to prevent or minimize the delay, the schedule by which these measures will be implemented, and requesting approval of a revised schedule. If the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control of BWC, the time for performance hereunder shall be extended for a reasonable period of time as is appropriate under the circumstances, provided that an extension of the time for performance of one event shall not necessarily entail an extension of the time for performance of subsequent events. Increased costs of performance of the requirements of this Consent Decree shall not be circumstances beyond the reasonable control of BWC justifying an extension in the time for performance. In the event MDNR disapproves BWC's request for a delay in performance, BWC may promptly submit the matter to this Court for resolution in accordance with Section VII.C.

IX. COORDINATION AND NOTIFICATION

A. Designation of Coordinator

The parties shall designate a coordinator and an alternate within 15 days following entry of this Consent Decree. At any time, the parties may appoint new coordinators, alternates or both and shall so advise the other parties in writing. To the maximum extent possible, communications between the parties shall be made between coordinators. Whenever, pursuant to this Consent Decree, a report, notice, approval or other document is required to be forwarded by one party to another, it shall be sent by certified or registered mail, return receipt requested, to the attention of the coordinators at the addresses specified below.

To MDNR: Director
Michigan Department of Natural Resources
Box 30028
Lansing, Michigan 48909

To BWC: General Manager
Wyandotte Works
BASF Wyandotte Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192

B. Designation of Field Representative

MDNR shall designate a field representative and an alternate within fifteen (15) days following entry of this Consent Decree. The field representative shall have authority to act on behalf of MDNR on matters relating to the site work, measurements during construction, and compliance with the specifications of this Consent Decree. The MDNR field representative shall be available for consultation during construction activities, which activities will be scheduled by BWC and its contractors. In the event of a disagreement among the BWC project manager and the MDNR field representative, the matter shall be referred to the coordinators for resolution. In the event the matter is not resolved by the coordinators, BWC shall file a petition with the Court in accordance with Section VII.C. of this Consent Decree.

C. Notice of Commencement of Construction

BWC shall provide written notice to the MDNR coordinators and to the Attorney General of Michigan at least thirty (30) days prior to the commencement of construction of the Site Modification Program set out in Section V. Subsequent notice of construction activities shall be based upon a written schedule provided by the BWC project manager to the MDNR field representative.

D. Certification of Completion by BWC

On or before December 31, 1986, BWC shall provide to MDNR a final certification that the Site Modification Program described in Section V of this Consent Decree has been completed and placed in operation in accordance with the requirements of this Consent Decree.

X. INFORMATION

All data, information and other documents in the possession of BWC and not privileged, which relate to obligations undertaken by BWC pursuant to this Consent Decree, shall be provided by BWC to MDNR upon request. Documents or information entitled to confidentiality under applicable Michigan law shall be disclosed by MDNR only in accordance with the procedure set out in MCL 299.528.

XI. ACCESS TO SITES

A. Access by MDNR Representative

BWC shall permit the MDNR field representative, and such other agency employees, contractors and consultants as the field representative requires to assist him in his duties under this Consent Decree, to enter the Sites at all reasonable times. The field representative and the persons assisting him shall at all times observe Michigan OSHA, OSHA, NIOSH, and any applicable EPA rules.

B. Taking of Samples

BWC or MDNR may take any samples from the North or South Works to demonstrate or check compliance with this Consent

Decree. Such samples shall be split with the other parties upon request. Any analysis not covered by Section V. shall be conducted in accordance with then-currently applicable laws, regulations or such other analytical procedures as may be agreed upon by BWC and MDNR.

C. No Limitation on Entry

Nothing in this Consent Decree is intended to limit in any way the right of entry or inspection or sampling of MDNR that it may otherwise have by operation of any law.

XII. SALE OR LEASE OF NORTH OR SOUTH WORKS SITES

Should BWC sell or lease any portion or all of the North or South Works during the term of the remedial action program set forth in this Consent Decree, BWC shall retain legal right of access (whether by easement or otherwise) to those portions of the North or South Works where subsurface drains, groundwater extraction wells, pumping systems, discharge systems, monitor wells and piezometers, etc., are located to ensure that its obligations under the Consent Decree can be carried out. Sixty (60) days prior to any intended sale or lease, BWC shall deliver to MDNR and the Attorney General of Michigan copies of any proposed documents retaining such legal right of access, which documents shall demonstrate that BWC has in fact retained legal right of access (whether by easement or otherwise) to those portions of the North and South Works where subsurface drains, groundwater extraction wells, pumping systems, discharge systems, monitor wells and piezometers, etc., are located to ensure that its obligations under the Consent Decree can be carried out. The State shall have sixty (60) days from receipt of such documents to object in writing thereto. Any objection by the State shall specify in detail how such documents are inadequate to ensure the discharge of BWC's obligations under the Consent Decree. Any dispute by the parties shall be resolved by the Court in accordance with Section VII.C. hereof, except that MDNR shall bear the burden of persuasion by a preponderance of the evidence.

XIII. FINANCIAL RESPONSIBILITY

A. Funding of Capital Expenditures

BWC shall fund all capital expenditures and pay all expenses necessary to accomplish the measures set forth in this Consent Decree except that BWC shall not reimburse MDNR for any of its expenses in connection with this Consent Decree, other than those provided for in Section XV.

B. Certification of Net Worth

1. Upon entry of this Consent Decree with the Court, BWC shall submit to MDNR either a statement certified by its chief financial officer that its net worth is not less than Twenty Million ($20,000,000) Dollars or a copy of its financial statements for the fiscal year last ended, showing a net worth of not less than Twenty Million ($20,000,000) Dollars. If at any time prior to the completion of the construction of the remedial programs described in Appendix B or C BWC's net worth decreases to below Twenty Million ($20,000,000) Dollars, BWC shall immediately notify MDNR and shall promptly provide security in an amount sufficient for the performance of BWC's obligations hereunder through the completion of construction. Such security may take the form of a performance bond, a letter of credit, the guaranty

of a corporation having a net worth of not less than twenty Million ($20,000,000) Dollars, or such other form of security to which the parties may hereafter agree.

2. If, subsequent to the completion of construction, but prior to the termination of BWC's other obligations under this Consent Decree, BWC's net worth decreases to below Ten Million ($10,000,000) Dollars, BWC shall immediately notify MDNR, and shall promptly provide security in an amount sufficient for the performance of BWC's remaining obligations under this Consent Decree. Such security may take the form of a performance bond, a letter of credit, the guaranty of a corporation have a net worth of not less than Ten Million ($10,000,000) Dollars, or such other form of security to which the parties may hereafter agree.

XIV. SETTLEMENT, RELEASES, AND EFFECT OF THIS CONSENT DECREE ON OTHER LAWS AND THIRD PARTIES

A. All Work to be Done in Accordance With Applicable Laws and Regulations

All work undertaken by BWC pursuant to this Consent Decree is to be performed in accordance with all federal, state and local statutes, regulations and ordinances including, but not limited to, the Occupational Safety and Health Act, 29 U.S.C. 651, et seq., Clean Water Act, 33 U.S.C. 1251, et seq., the Water Resources Commission Act, 1929 PA 245, as amended, MCL 323.1, et seq., and the Anderson-Rockwell Environmental Protection Act, 1970 PA 127, MCL 691.1201, et seq.

B. No Admissions

This Consent Decree represents a compromise of disputed issues and facts and BWC expressly makes no admission of fact or liability concerning any acts or liabilities asserted against it in this action. Nothing contained in this Consent Decree shall be deemed an admission of fact or liability or evidence of same, nor of any violation of law or regulation.

C. Rights of Third Parties Not Affected

This Consent Decree shall neither create nor affect rights of persons or entities who are not parties of this Consent Decree and who are not described in Section II. of this Consent Decree.

D. No Waiver of Claims Against Third Parties

The State of Michigan does not waive any claims or rights it may have against any person or entity not a party to this Consent Decree.

E. Release

The execution by the parties and the entry by the Court of this Consent Decree shall constitute full settlement of the claims asserted, or which could have been asserted, on behalf of the Plaintiffs and the State of Michigan in this action and shall constitute a full discharge and release of BWC, its subsidiaries, parent companies, predecessors, affiliates, successors and assigns, and its and their officers, directors, agents and employees from any liability of any kind or nature whatsoever under, but not limited to, the Resource Conservation and Recovery Act, 42 U.S.C. §6901 et seq., the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §9601 et seq., the Water Resource Commission Act, 1929 PA 245, MCL §323.1 et seq., the Anderson-Rockwell Environmental Protection Act, 1970 PA 127, MCL §691.1201 et seq., and any other statute, common law, regulation or rule of the United States of America or the State of Michigan, resulting from or in any way relating to

1. The disposal or presence of known chemicals or other known substances at, on or under the Sites prior to the entry of this Consent Decree;

2. The continuing presence of such known chemicals or other known substances at, on or under the Sites subsequent to the entry of this Consent Decree;

3. The migration, discharge or release of such known chemicals or other known substances from the Sites prior to the completion of construction of the Site Modification

Program referred to in Section V. of this Consent Decree; and

4. The migration, discharge or release of such known chemicals or other known substances from the Sites subsequent to completion of construction of the Site Modification Program referred to in Section V. of this Consent Decree, unless such migration, discharge or release results from a violation of this Consent Decree or any discharge permit.

"Known chemicals or other known substances" means chemicals or substances known by MDNR to be present at the Sites as of the date of entry of this Consent Decree.

The State of Michigan specifically retains the right and authority to enforce the terms of this Consent Decree.

XV. COSTS

Within fifteen (15) days after entry of this Consent Decree, BWC shall pay the State of Michigan, c/o Chief, Environmental Protection Division, Department of the Attorney General, the sum of Two Hundred Ninety Thousand ($290,000.00) Dollars for its past and future costs. Each other party to this Consent Decree shall bear its own costs in this action and in the implementation of this Consent Decree.

XVI. SEVERABILITY

It is the intent of the parties hereto that the provisions of this Consent Decree shall be severable, and should any provision be declared by a court of competent jurisdiction to be inconsistent with State or Federal law, and therefore unenforceable, the remaining clauses shall remain in full force and effect.

XVII. RETENTION OF JURISDICTION

This Court specifically retains jurisdiction over the subject matter and the parties for the purpose of enforcing or construing or modifying the provisions of this Consent Decree.

AVERN COHN
United States District Judge

DATED AND ENTERED:

The parties agree and consent hereto.

FRANK J. KELLEY
Attorney General

____
STEWART H. FREEMAN
Assistant Attorney General in Charge
Environmental Protection Division

____
STEPHEN F. SCHUESLER
Assistant Attorney General
Environmental Protection Division
Department of Attorney General
720 Law Building
Lansing, Michigan 48913

BASF WYANDOTTE CORPORATION
a Michigan corporation, Defendant

By: ________________________________

Its ______________________________

and by

FISCHER, FRANKLIN, FORD, SIMON
& HOGG

By: ________________________________
William C. Potter, Jr.

and ________________________________
Thomas M. Woods

Attorneys for Defendant
BASF Wyandotte Corporation

1700 Guardian Building
Detroit, Michigan 48226

APPENDIX A

PROPERTY DESCRIPTION NORTH and SOUTH WORKS

NORTH WORKS

The land located in the City of Wyandotte, Wayne County, State of Michigan described as being part of fractional Sections 21 and 28, T. 3 S., R. 11 E. and generally described as being bounded on the north by Perry Place, on the east by the U.S. Harbor Line of the Detroit River, on the south by Mulberry Street and of the west by Biddle Avenue. Exhibit I, Appendix B is a generalized map of the North Works.

SOUTH WORKS

The land located in the City of Wyandotte, Wayne County, State of Michigan, described as being part of fractional Section 32, T. 3 S., R. 11 E. and generally described as being bounded on the north by Pine Street, on the east by the U.S. Harbor Line of the Detroit River, on the south by Wye Street and on the west by Biddle Avenue. Exhibit I, Appendix C is a generalized map of the South Works.

APPENDIX B

N O R T H   W O R K S

REMEDIAL PROGRAM

INTRODUCTION

BWC will undertake a remedial program that addresses the movement of groundwater towards the Detroit River and the City of Wyandotte sewer system from Locations A, B and C as shown on Exhibits I through V of this appendix.

A. EXTRACTION SYSTEMS

A groundwater extraction system shall be installed in Locations A, B, and C. The approximate position of each extraction system is shown on Exhibit I. Exhibits II, III and IV provide information on the number and placement of extraction wells and piezometers for Locations A, B and C respectively. The number of wells and the rate of withdrawal from the wells for each location shall be at all times sufficient to halt the flow of contaminated groundwater to the Detroit River and the City of Wyandotte sewer system by maintaining a hydraulic gradient toward the extraction wells.

BWC shall maintain the extraction wells including cleaning, replacement of screens and replacement of any extraction well that will not produce water due to failure of well components. A piezometer system shall be installed and the water level will be measured on the schedule established in paragraph D of this appendix, to demonstrate the creation and maintenance of an inward hydraulic gradient at Locations A, B and C.

B. TREATMENT SYSTEMS

A groundwater treatment system(s) shall be installed to treat the water removed by each extraction well system pursuant to the Implementation Schedule. BWC shall maintain the treatment system(s) until the conditions for cessation of operation are met.

C. IMPLEMENTATION SCHEDULE

BWC shall complete installation of the remedial program described in this appendix on or before December 31, 1986.

BWC shall develop the basis of design of an activated carbon system, or its equivalent, construct such system and commence its operation on or before December 31, 1986. The basis of design and the final process flow diagram and operations manual shall be submitted to MDNR for review and approval which shall be completed within thirty (30) days of submittal.

D. MONITORING

Piezometers/monitor wells shall be installed in Locations A, B and C approximately as shown on Exhibits II through IV. The specific locations of the piezometers and monitor wells shall be described on as built plans.

The water level in each piezometer, and each extraction well shall be measured monthly for the first year following installation of the piezometers and quarterly thereafter. BWC shall demonstrate that an inward hydraulic gradient toward each extraction well system exists that is adequate to halt the flow of contaminated groundwater from the North Works to the Detroit River. Thereafter, the water level elevation in each piezometer shall be measured quarterly.

MONITORING (Continued)

BWC shall operate all extraction and treatment systems for a period of not less than 15 years. Following that period, BWC may give notice of intent to discontinue operation of any extraction well, extraction system or treatment system if six (6) consecutive samples collected in June and October in each of three (3) consecutive years from such well(s), extraction system, treatment system and associated monitoring well(s) demonstrate that the required concentration levels of contaminants have been achieved, or BWC can demonstrate that the concentration of the chemicals identified in the basis of design are no longer effectively being removed by the treatment system. "The required concentration levels of contaminants" means that the concentrations of contaminants identified in the basis of design of the treatment system(s) are less than the level of detectibility described in this paragraph D. If such demonstration is made, such extraction well, extraction system or treatment system may be plugged and abandoned in accordance with the procedures set forth in Paragraph VI of the Consent Decree. In any event, as of the beginning of the twenty-sixth (26th) year of the operation of the system, BWC shall commence such collection and analysis of samples from each extraction well and monitor well then in operation, which collection and analysis shall continue until the end of the thirty (30) year period provided by the Consent Decree. The samples shall be analyzed for the chemicals listed in the basis of design of the treatment system(s).

1,2-Dichloropropane
1,2-Dichloroethane
Methylene Chloride
Chloroform

All analysis required under this Consent Decree shall use EPA Method 624 or 625 as published in the Federal Register on October 26, 1984. Concentrations shall be reported in detectable amounts based on ten (10) times signal-to-noise ratio. When using EPA Method 625, a 1000 ml water sample shall be concentrated to 2 ml of extract.

E. OPERATION OF THE SYSTEMS

Groundwater extracted and treated by the systems described in the Consent Decree, shall be discharged to the Wayne County Department of Public Works' Wastewater Treatment Plant in accordance with a permit to discharge issued by Wayne County to BWC or to the surface waters under an NPDES permit issued by the State to BWC.

F. OTHER CONDITIONS

Within thirty (30) days of the receipt of any influent or effluent data required under this remedial program, BWC shall provide the Department of Natural Resources with the numerical results.

BWC will provide thirty (30) days prior written notice to the Wayne County Public Works of its intent to discontinue the sampling of any groundwater source discharging to the Wayne County Public Works' Wastewater Treatment Plant.

BWC shall make application to discharge the groundwater collected from these remedial systems to the Wayne County Public Works' Wastewater Treatment Plant. In the event the characteristics of the groundwater require Wayne County to impose pretreatment as a condition precedent to discharge, BWC may elect to comply with the County's pretreatment requirements or, alternatively, BWC may make application for direct discharge to the Detroit River. In the event Wayne County is required to reject the groundwater discharge from any of the above systems, BWC shall make application for the direct discharge of such groundwater

OTHER CONDITIONS (Continued)

to the Detroit River. Should BWC make application for a permit to discharge groundwater to the Detroit River, the Michigan Department of Natural Resources shall review the application in accordance with then applicable regulations and shall not unreasonably deny the permit. Provided BWC (a) gives notice to MDNR within five (5) working days of receipt of notice by the County of its intent to reject BWC's discharge, (b) applies for a permit for direct discharge to the Detroit River within sixty (60) days following receipt of such notice by the County, and (c) takes all reasonable steps necessary to maintain a permitted discharge to the POTW during the period following the County's adoption of the pretreatment requirements, the groundwater collection systems shall not be operated unless a permit to discharge to Wayne County or, alternatively, to the Detroit River, has been issued and remains in effect. If BWC challenges the necessity for or the validity of any permit condition, BWC shall construct, maintain and operate treatment technology which has been agreed upon by the parties or which has been determined to be appropriate by this Court under Paragraph VII.C. of the Consent Decree until such challenge(s) has been resolved.

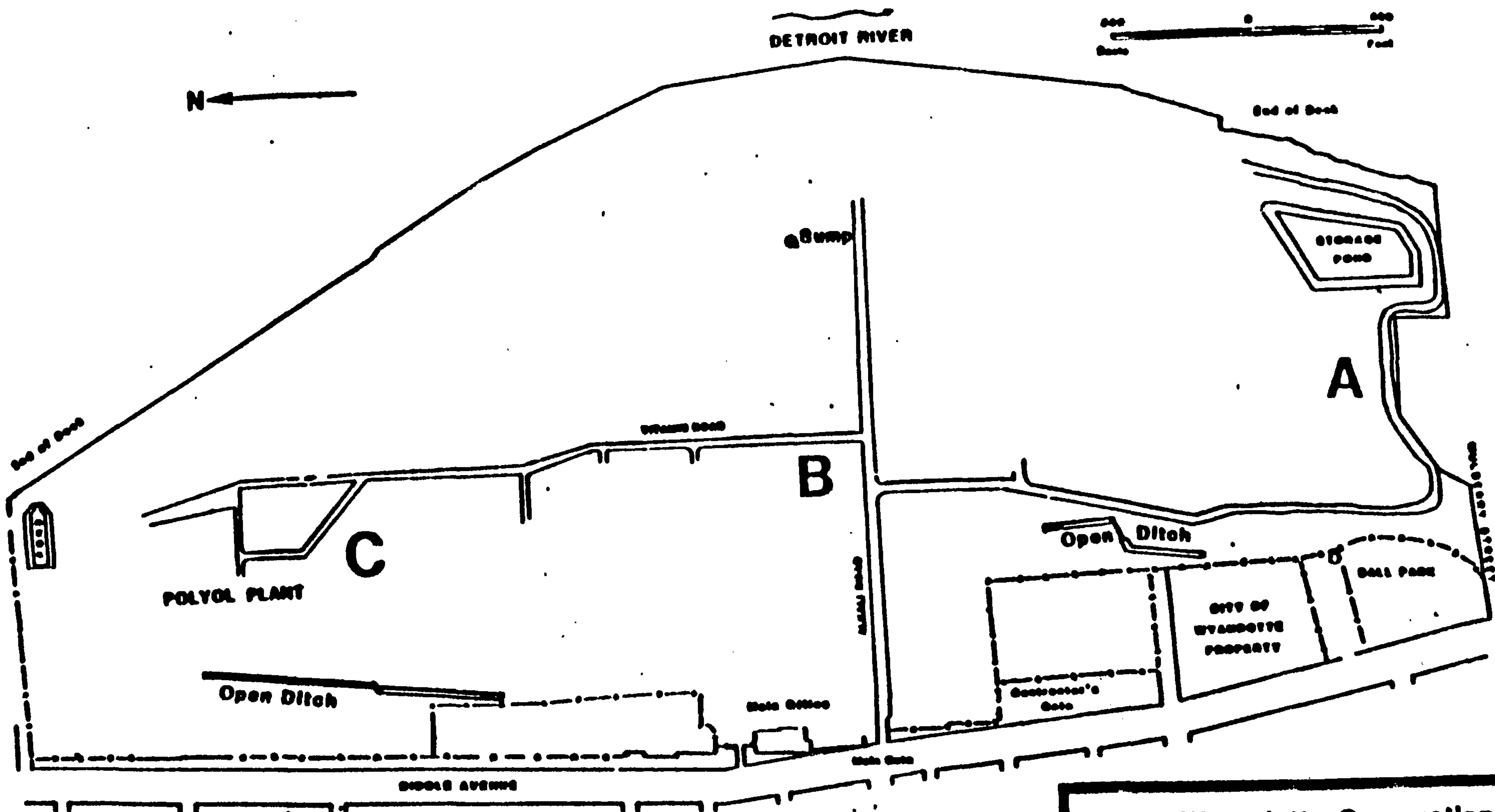
Upon application by BWC at any time after a fifteen (15) year period, the Department of Natural Resources shall determine whether the operation of any of the above systems or parts thereof is nc longer necessary to comply with conditions established by then existing law or regulations. If the operation of such system(s) is not required, it may be discontinued. BWC shall bear the bur-

OTHER CONDITIONS (Continued)

den of persuasion by a preponderance of the evidence that continued operation of the system(s) is no longer necessary.

All former observation wells will be plugged.

Soils and sludges excavated during construction of any groundwater collection system shall be managed in accordance with the law.

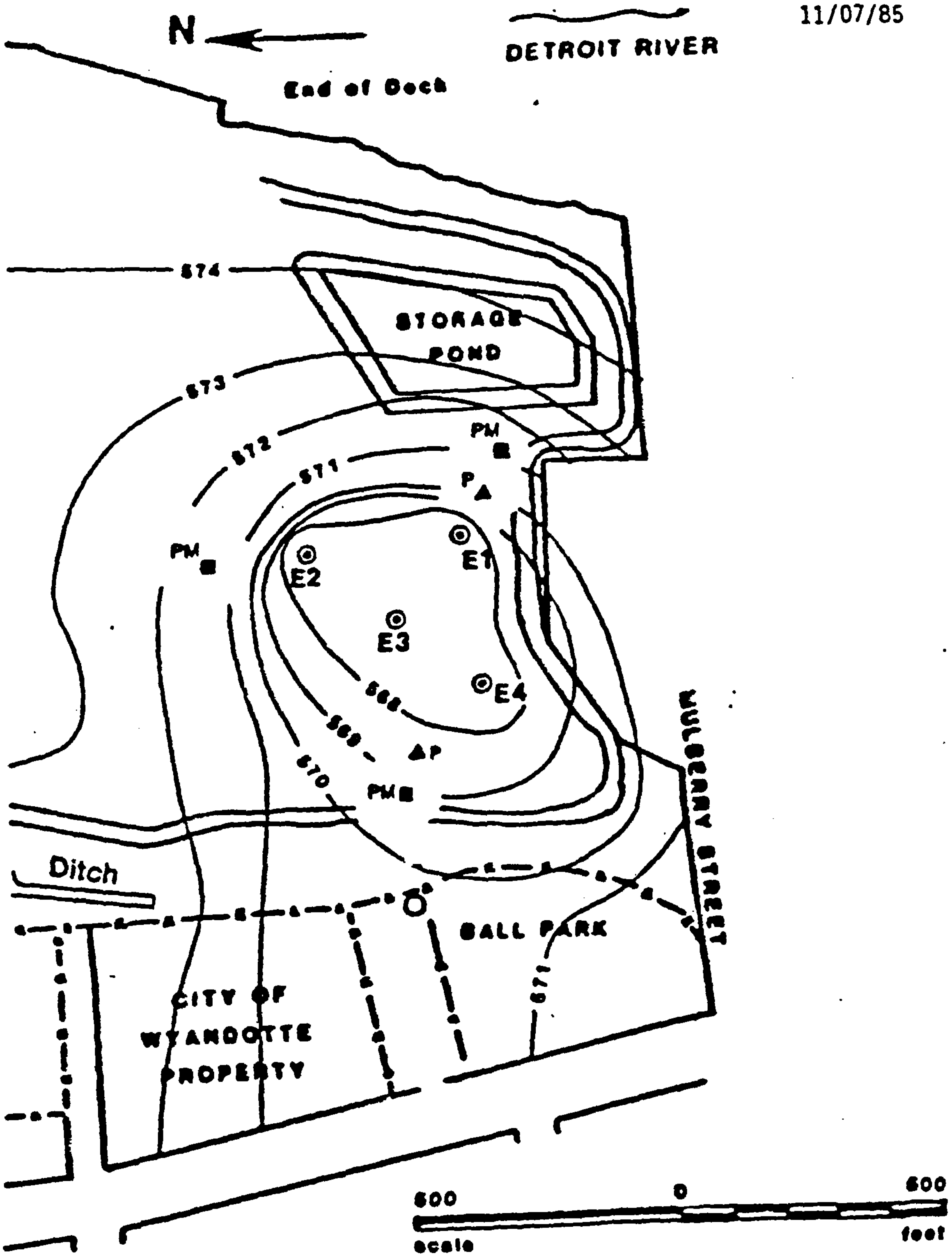


BASF Wyandotte Corporation
NORTH WORKS

EXHIBIT I
LOCATIONS

11/07/85

11/07/85

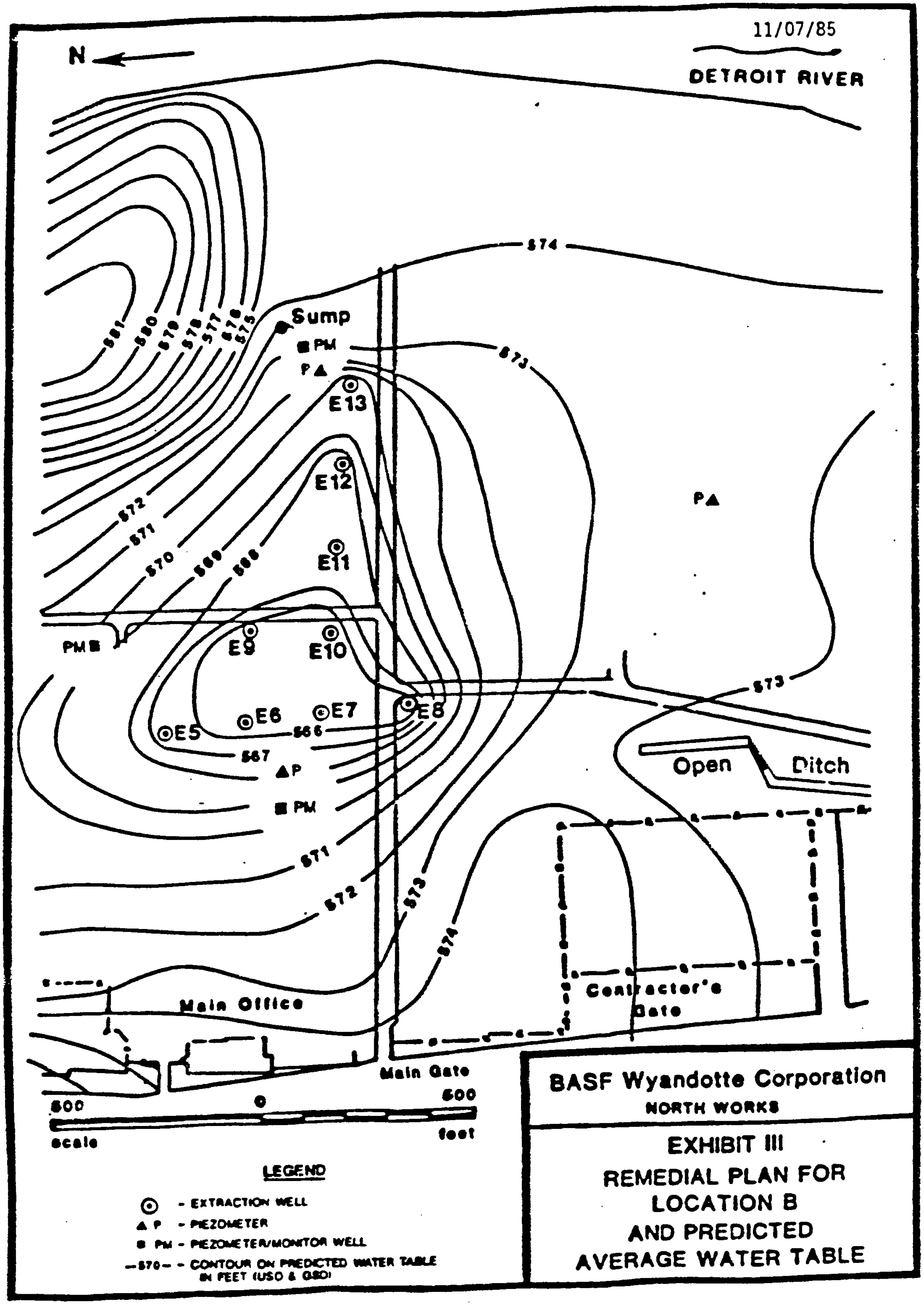


LEGEND

- ⊙ - EXTRACTION WELL
- ▲ P - PIEZOMETER
- ■ PM - PIEZOMETER/MONITOR WELL
- —570— - CONTOUR ON PREDICTED WATER TABLE IN FEET (USG & GSD)

BASF Wyandotte Corporation
NORTH WORKS

EXHIBIT II
REMEDIAL PLAN FOR LOCATION A AND PREDICTED AVERAGE WATER TABLE

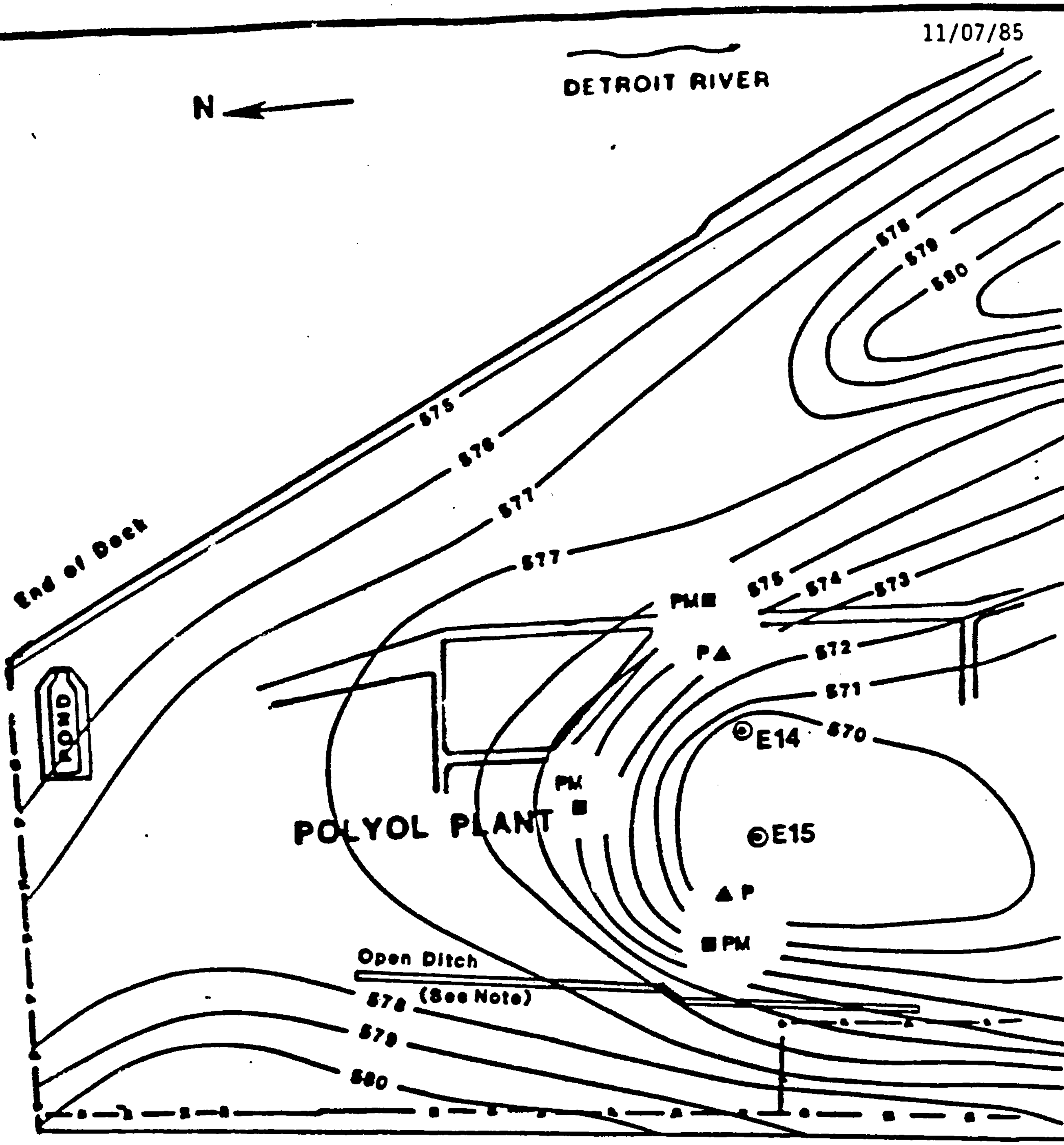


BASF Wyandotte Corporation
NORTH WORKS

EXHIBIT III
REMEDIAL PLAN FOR
LOCATION B
AND PREDICTED
AVERAGE WATER TABLE

LEGEND

- ⊙ - EXTRACTION WELL
- ▲ P - PIEZOMETER
- ■ PM - PIEZOMETER/MONITOR WELL
- —570— - CONTOUR ON PREDICTED WATER TABLE IN FEET (USG & GSD)



NOTE: Most ground-water discharge into ditch eliminated during system operation.

LEGEND

- ⊙ - EXTRACTION WELL
- ▲ P - PIEZOMETER
- ■ PM - PIEZOMETER/MONITOR WELL
- —570— - CONTOUR ON PREDICTED WATER TABLE IN FEET (USG & GSD)

BASF Wyandotte Corporation
NORTH WORKS

EXHIBIT IV
REMEDIAL PLAN FOR LOCATION C AND PREDICTED AVERAGE WATER TABLE

APPENDIX C

SOUTH WORKS

REMEDIAL PROGRAM

INTRODUCTION

BWC will undertake a remedial program for the South Works that addresses: the movement of groundwater towards the Detroit River in Area A and Area B; the presence of materials of concern in a deposit of gray solids in Area C; the tendency of water to pond in the surface in Area C; and the movement of groundwater toward Biddle Avenue in Area D.

A. REMEDIAL PROGRAM FOR AREA A

Area A is located in the southeast corner of the South Works adjacent to the Detroit River (Exhibit I).

The groundwater in this area of the site flows in the general direction of the Southeastern boundary of the site (Exhibit II). A subsurface drain system will be installed along a 400 foot north-south line located 200 feet west of the shoreline which shall halt the flow of groundwater moving from Area A toward the Detroit River and Wye Street. The location and design details of the system to be installed are set forth in the Exhibits III, IV, and V. The drain will be installed at a depth of about 15 feet near the top of the lake clay underlying the surficial materials in this area. A water level measuring device with an accuracy of ± 0.1 feet shall be installed in the sump.

Groundwater collected through the operation of this system will be discharged to the Wayne County Public Works' Wastewater Treatment Plant in accordance with a discharge permit issued by Wayne County to BWC. Groundwater will be collected and analyzed from the system during June and October of each year the system is in operation and analyzed for 1,2-dichloropropane, tetrachloroethylene and hexachlorobenzene.

June's report to MDNR issued on schedule
October's done in NOV & not yet REPORTED.

11/07/85
11/12/85R

Correct elevation 568 to IGLD 566.57

B. REMEDIAL PROGRAM FOR THE AREA B

Area B lies along the river front north of Area A (Exhibit I).

Groundwater extraction wells will be installed as shown on Exhibit III on 200 ± 50 foot centers 225 ± 25 feet landward from the face of the dock on the Detroit River. The construction details for the extraction wells are shown in Exhibit VI of this appendix. The number of wells and the rate of withdrawal of water therefrom shall at all times be sufficient to halt the flow of contaminated groundwater from Area B to the Detroit River by maintaining the groundwater level in each extraction well at elevation 568 feet or lower. Samples will be collected from the combined flow of all extraction wells in June and October of each year the system is in operation and analyzed for carbon tetrachloride.

See note at bottom of Sec. A.

The MDNR may designate two (2) extraction wells in the system to be maintained as monitor wells.

BWC shall maintain the extraction wells including cleaning, replacement of screens and replacement of any extraction well that will not produce water due to failure of well components. Water removed by the extraction wells shall be discharged to the Wayne County Department of Public Works' Wastewater Treatment Plant in accordance with a discharge permit issued by Wayne County to BWC. A piezometer system shall be installed and water level will be measured on the schedule established in paragraph F of this appendix, to establish the long term pumping rate for each extraction well.

11/07/85
11/12/85R

C. REMEDIAL PROGRAM IN AREA C

Area C is located in the northern third of the site as shown in Exhibit I. BWC shall install an extraction well system as shown in Exhibit VII. The number of wells and the rate of withdrawal of water therefrom shall at all times be sufficient to halt the flow of contaminated groundwater from leaving Area C and to maximize the pore displacement of the ~~system by~~ maintaining the groundwater level at elevation no higher than 563 feet at Extraction Well No. 5 as shown on Exhibit VIII of this appendix. The water from the extraction well system will discharge via a piping system to the Wayne County Department of Public Works' Wastewater Treatment Plant in accordance with a discharge permit issued by Wayne County to BWC. The construction details are shown in Exhibits VIII and IX.

Samples will be collected and analyzed from the combined flow from all extraction wells in June and October each year the system is in operation for hexachlorobenzene, hexachlorobutadiene and trichloroethylene.

The remedial program for this area will include grading and filling as necessary to eliminate standing water.

D. REMEDIAL PROGRAM FOR AREA D

Area D is located on the western edge of the South Works along Biddle Avenue, as shown on Exhibit I of this appendix.

The groundwater in this area of the site flows to the west in the general direction of Biddle Avenue (Exhibit II). A subsurface drain system will be installed

REMEDIAL PROGRAM IN AREA D (Continued)

which shall collect the groundwater in Area D and discharge the water collected to the Wayne County Department of Public Works' Wastewater Treatment Plant in accordance with a discharge permit issued by Wayne County to BWC. The location and design details of this drainage system are set forth in Exhibits V and X. A system shall be installed to measure the water level at or near the point of discharge.

Groundwater samples will be collected and analyzed from this system in June and October of each year that the drainage system is in operation for 1,2 dichloropropane, trichloroethylene, and tetrachloroethylene.

A system of three (3) piezometers will be installed in the vicinity of Area D to demonstrate that the slope of the groundwater table is in the direction of the drainage system described above. In the event the building foundations are removed or found not to represent a barrier to the movement of groundwater toward Biddle Avenue during the agreed upon period of operation of the drainage system, the drainage system shall be extended as needed to collect groundwater from Area D.

11/07/85
11/12/85R

E. IMPLEMENTATION SCHEDULE

BWC shall complete installation of the remedial program for the South Works on or before December 31, 1986.

F. MONITORING

1. PURPOSE OF MONITORING

The purpose of the water level and water quality monitoring provisions is to determine whether the remedial systems are meeting the requirements of this Consent Decree.

2. WATER LEVELS

Piezometers, extraction wells and monitor wells shall be installed in Areas A and B at the approximate locations shown in Exhibit III by December 31, 1986.

The water level in each piezometer and each extraction well in Areas A, B and D shall be measured monthly for the first year following installation of the piezometers and quarterly thereafter until a demonstration has been made that the collection systems have halted the flow of contaminated groundwater from these areas. Once this demonstration has been made and reported to the MDNR, no further water level measurements will be required and the piezometers may be plugged unless MDNR, for good cause shown, can demonstrate a need for continuation of the water level measurements within sixty (60) days of receipt of the report.

WATER LEVELS (Continued)

The piezometer system required under the program for Area D shall be installed and the required water level measurements will commence within one (1) year after completion of the collection system. The water level shall be measured monthly in each piezometer and in monitor wells MW-3, MW-4, and MW-5 for one (1) year and quarterly thereafter until a demonstration has been made that the flow of contaminated groundwater to the Detroit River has been halted. Once this demonstration has been made and reported to the MDNR, no further water level measurements will be required and the piezometers may be plugged unless MDNR, within sixty (60) days of receipt of the report, can demonstrate a need for continuation of the water level measurements.

3. WATER QUALITY

BWC shall operate all extraction systems for a period of not less than fifteen (15) years. Following that period, BWC may give notice of intent to discontinue operation of any single well and/or extraction system if six (6) consecutive samples collected from such well(s), extraction system, treatment system and associated monitoring well(s) in June and October of each of three (3) consecutive years demonstrates that the concentrations of the chemicals listed in Table I below are less than ten (10) times signal-to-noise using EPA Method 624 or 625. All analysis using EPA Method 625 shall be based on a 1000 ml sample concentrated to 2 ml of extract.

WATER QUALITY (Continued)

TABLE I

Parameter	Remedial Area A	B	C	D
1,2-Dichloropropane	X			X
Tetrachloroethylene	X			
Hexachlorobenzene	X		X	X
Carbon tetrachloride		X		
Hexachlorobutadiene			X	
Trichloroethylene			X	X

*All monitor wells shall be analyzed for chloroform during the above monitoring for the appropriate area(s).

If concentration levels for the appropriate area(s) are achieved, operation of the extraction well or extraction system(s) may be discontinued in accordance with the procedures set forth in Paragraph VI of the Consent Decree.

In any event, in June and October of each year beginning with the twenty-fifth (25th) year of the operation of the system on the South Works, BWC shall collect and analyze samples from each extraction well and monitor well then in operation, which collection and analysis shall continue until the end of the thirty (30) year period provided by the Consent Decree.

G. OTHER CONDITIONS

Within thirty (30) days of the receipt of any groundwater data under this remedial program, BWC shall provide the Department of Natural Resources with the numerical results.

BWC will provide thirty (30) days prior written notice to the Wayne County Public Works of its intent to discontinue the sampling of any groundwater source discharging to the Wayne County Public Works' Wastewater Treatment Plant.

OTHER CONDITIONS (Continued)

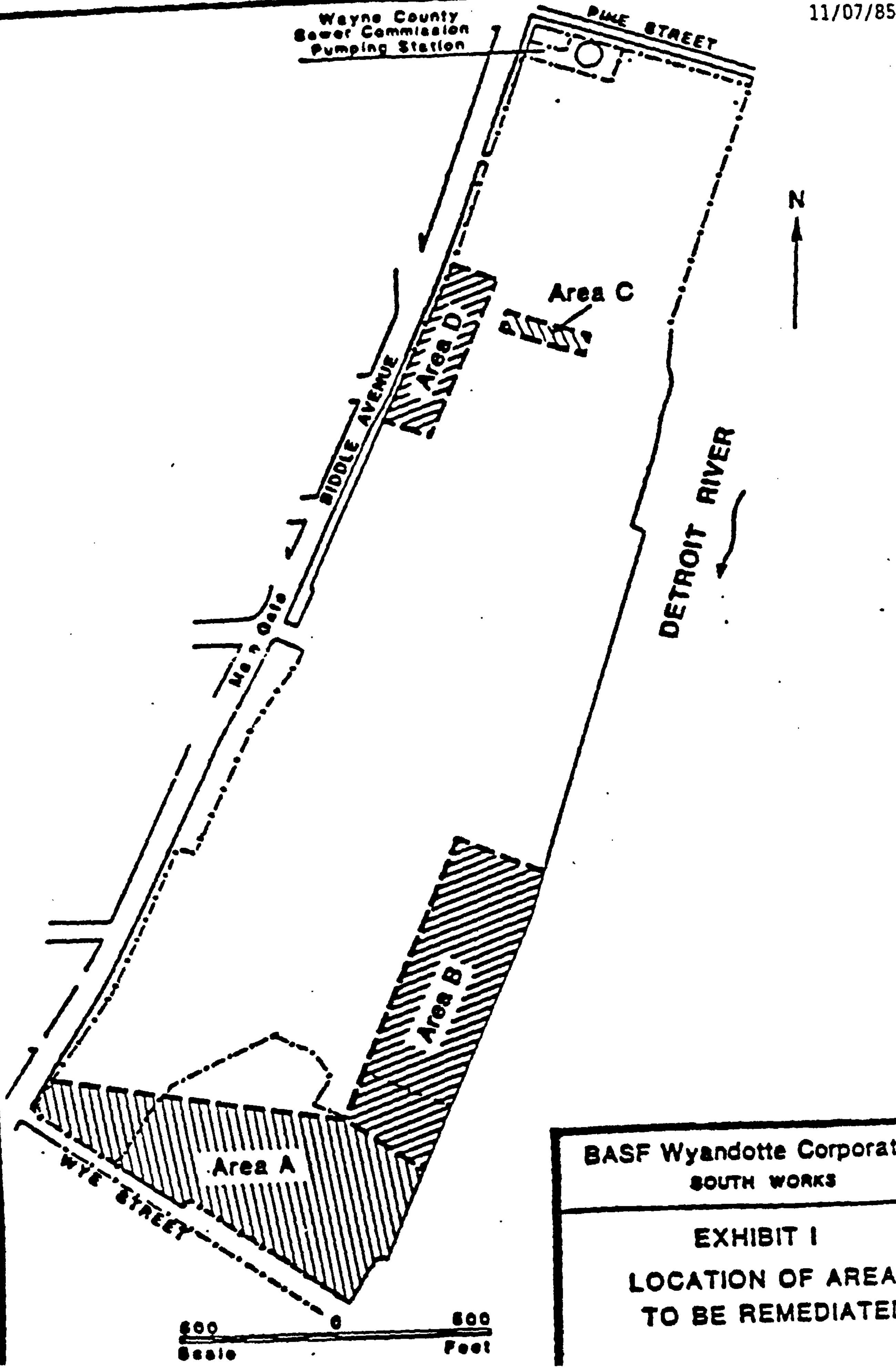
BWC shall make application to discharge the groundwater collected from these remedial systems to the Wayne County Public Works' Wastewater Treatment Plant. In the event the characteristics of the groundwater require Wayne County to impose pretreatment as a condition precedent to discharge, BWC may elect to comply with the County's pretreatment requirements or, alternatively, BWC may make application for direct discharge to the Detroit River. In the event Wayne County is required to reject the groundwater discharge from any of the above systems, BWC shall make application for the direct discharge of such groundwater to the Detroit River. Should BWC make application for a permit to discharge groundwater to the Detroit River, the Michigan Department of Natural Resources shall review the application in accordance with then applicable regulations and shall not unreasonably deny the permit. Provided BWC (a) gives notice to MDNR within five (5) working days of receipt of notice by the County of its intent to reject BWC's discharge, (b) applies for a permit for direct discharge to the Detroit River within sixty (60) days following receipt of such notice by the County, and (c) takes all reasonable steps necessary to maintain a permitted discharge to the POTW during the period following the County's adoption of the pretreatment requirements, the groundwater collection systems shall not be operated unless a permit to discharge to Wayne County or, alternatively, to the Detroit River, has been issued and remains in effect. If BWC challenges the necessity for or the validity of any permit condition, BWC shall construct, maintain and operate treatment technology which has been agreed upon by the parties or which has been determined to be appropriate by this Court under Paragraph VII.C. of the Consent Decree until such challenge(s) has been resolved.

OTHER CONDITIONS (Continued)

Upon application by BWC at any time after a fifteen (15) year period, the Department of Natural Resources shall determine whether the operation of any of the above systems is no longer necessary to comply with conditions established by then existing law or regulations. If the operation of such systems(s) is not required, it may be discontinued. BWC shall bear the burden of persuasion by a preponderance of the evidence that continued operation of the system(s) is no longer necessary.

Soils and sludges excavated during construction of any groundwater collection system shall be managed in accordance with the law.

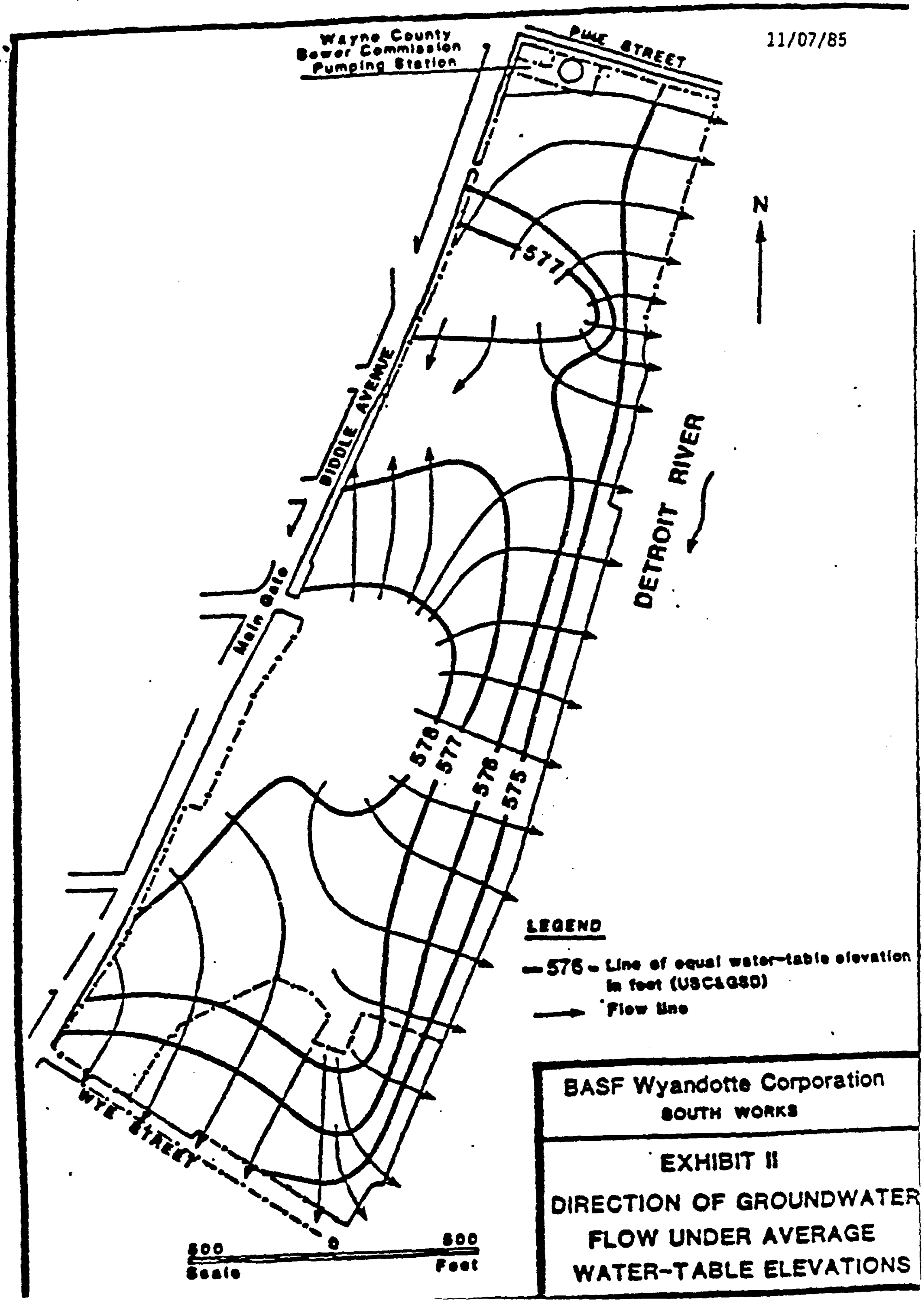
11/07/85



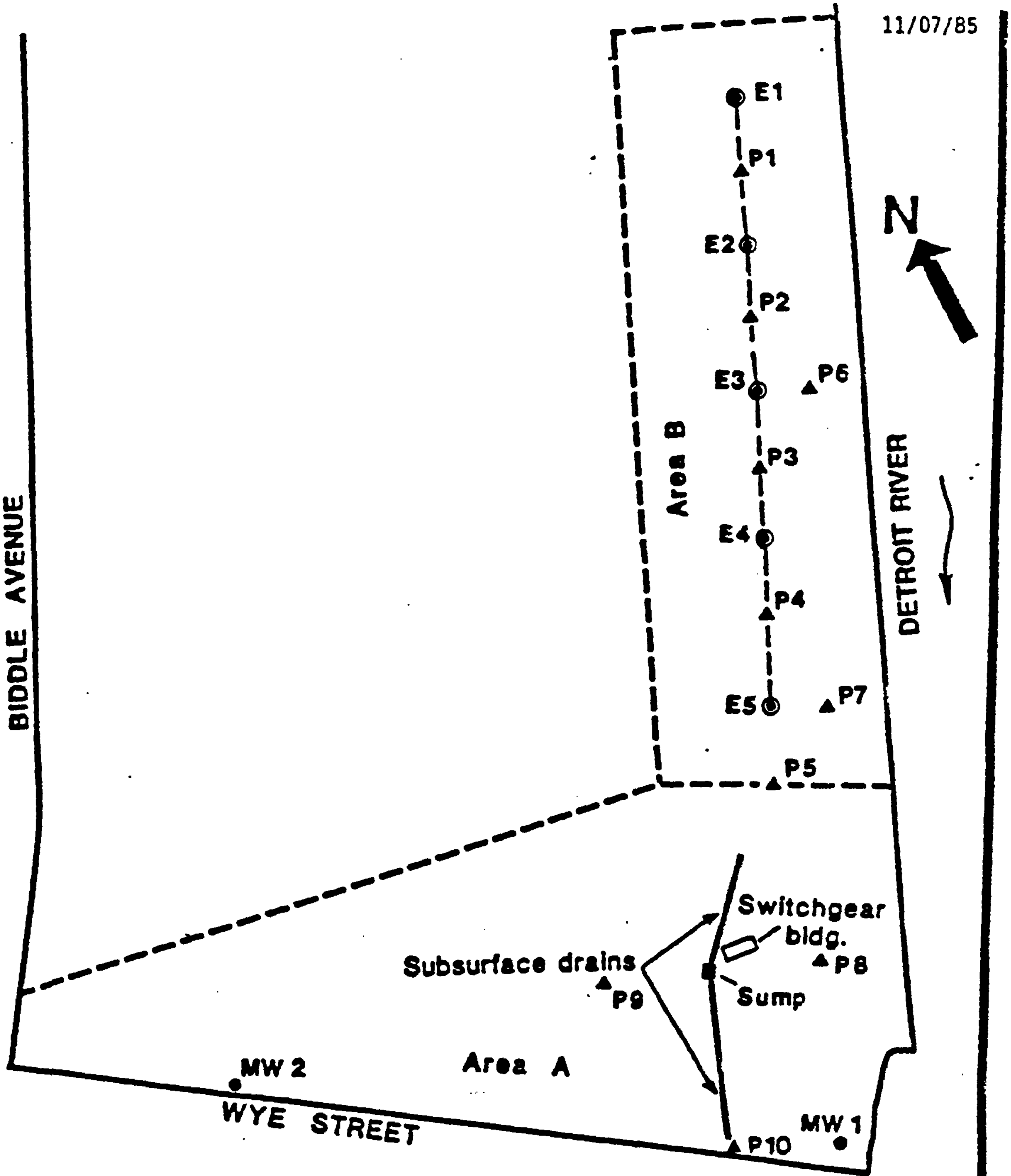
BASF Wyandotte Corporation
SOUTH WORKS

EXHIBIT I

LOCATION OF AREAS
TO BE REMEDIATED


11/07/85
Wayne County Sewer Commission Pumping Station
PINE STREET
N
577
BIDDLE AVENUE
DETROIT RIVER
Main Gate
578
577
576
575
WYE STREET
LEGEND
576 Line of equal water-table elevation in feet (USC&GSD)
Flow line
500 0 500
Scale Feet
BASF Wyandotte Corporation
SOUTH WORKS
EXHIBIT II
DIRECTION OF GROUNDWATER FLOW UNDER AVERAGE WATER-TABLE ELEVATIONS

11/07/85



LEGEND

MW 1	•	Monitoring well
E1	◉	Extraction well
P1	▲	Piezometer

200 0 200

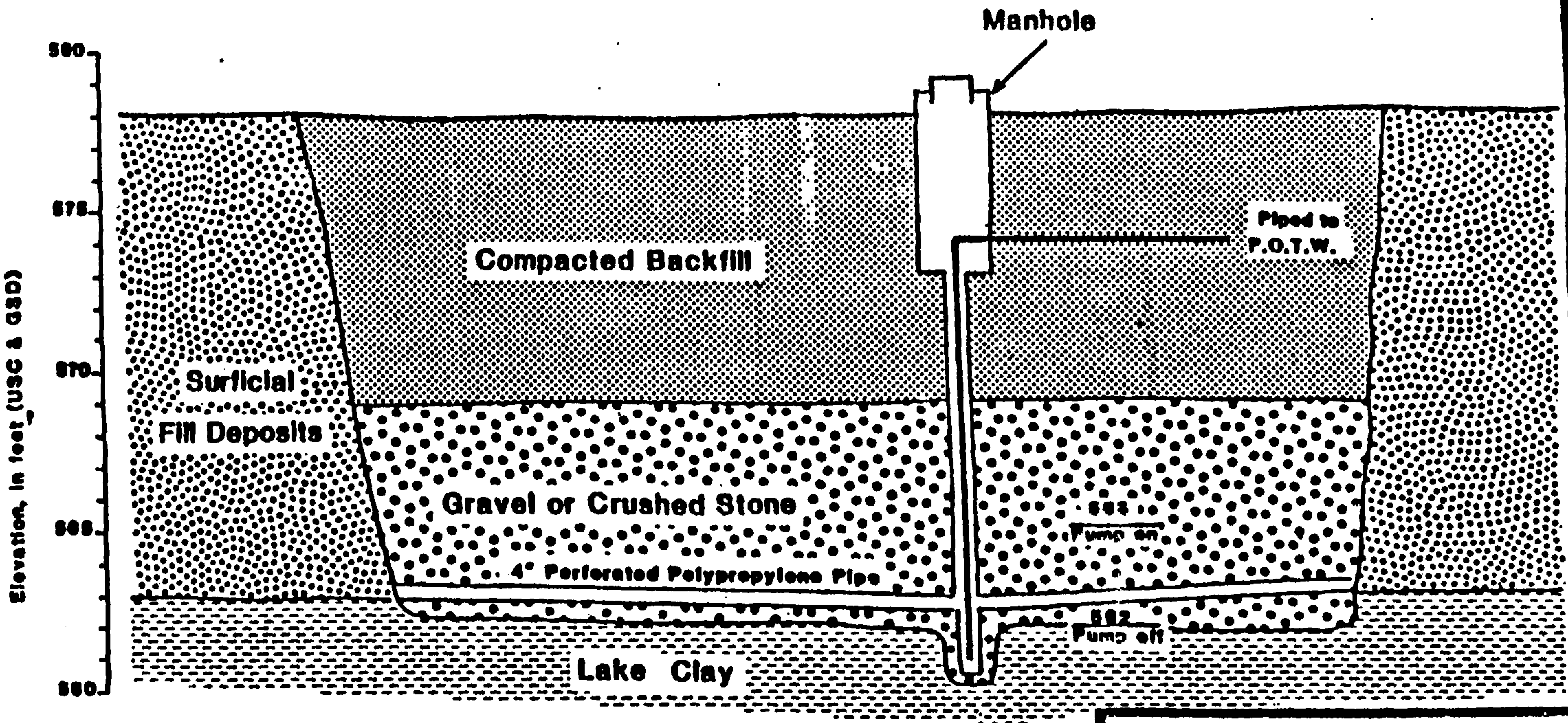
scale feet

BASF Wyandotte Corporation

SOUTH WORKS

EXHIBIT III

REMEDIAL PLAN FOR AREAS A AND B



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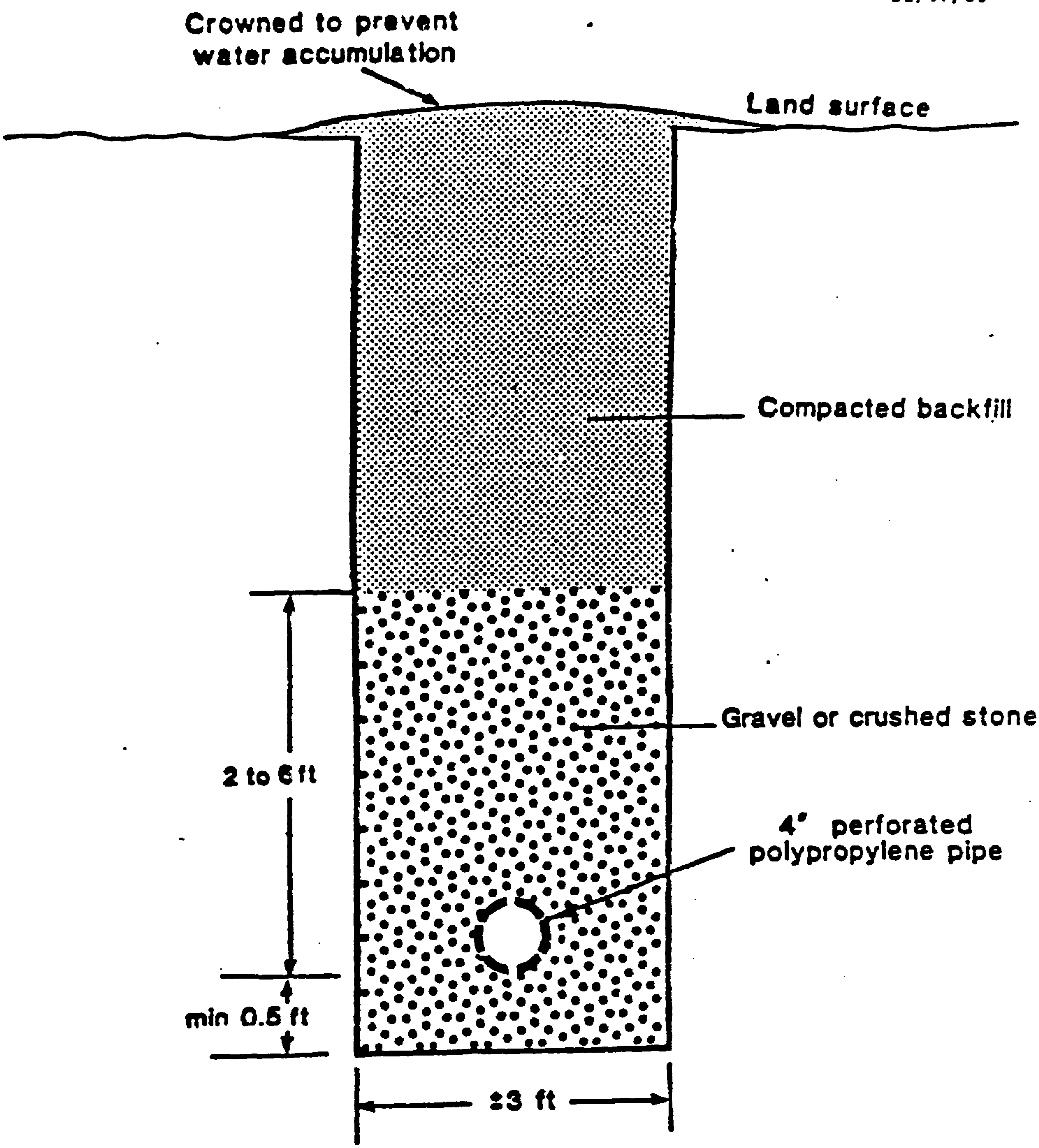
SOUTH WORKS

EXHIBIT IV
PROFILE ALONG
DRAINS – AREA A

11/07/85

11/07/85

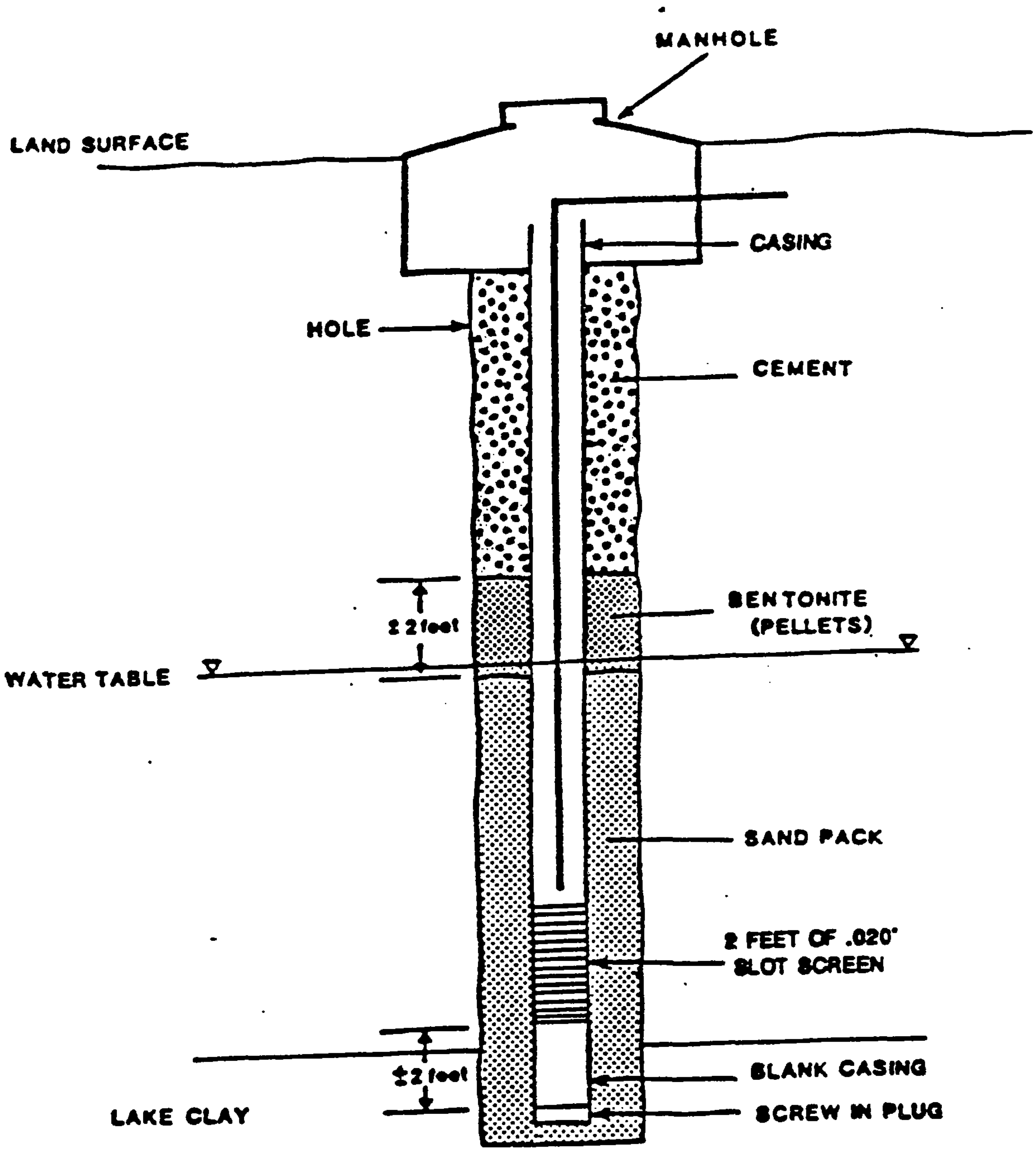


NOT TO SCALE

BASF Wyandotte Corporation
SOUTH WORKS

EXHIBIT V
SCHEMATIC DIAGRAM
OF TYPICAL
DRAIN CONSTRUCTION

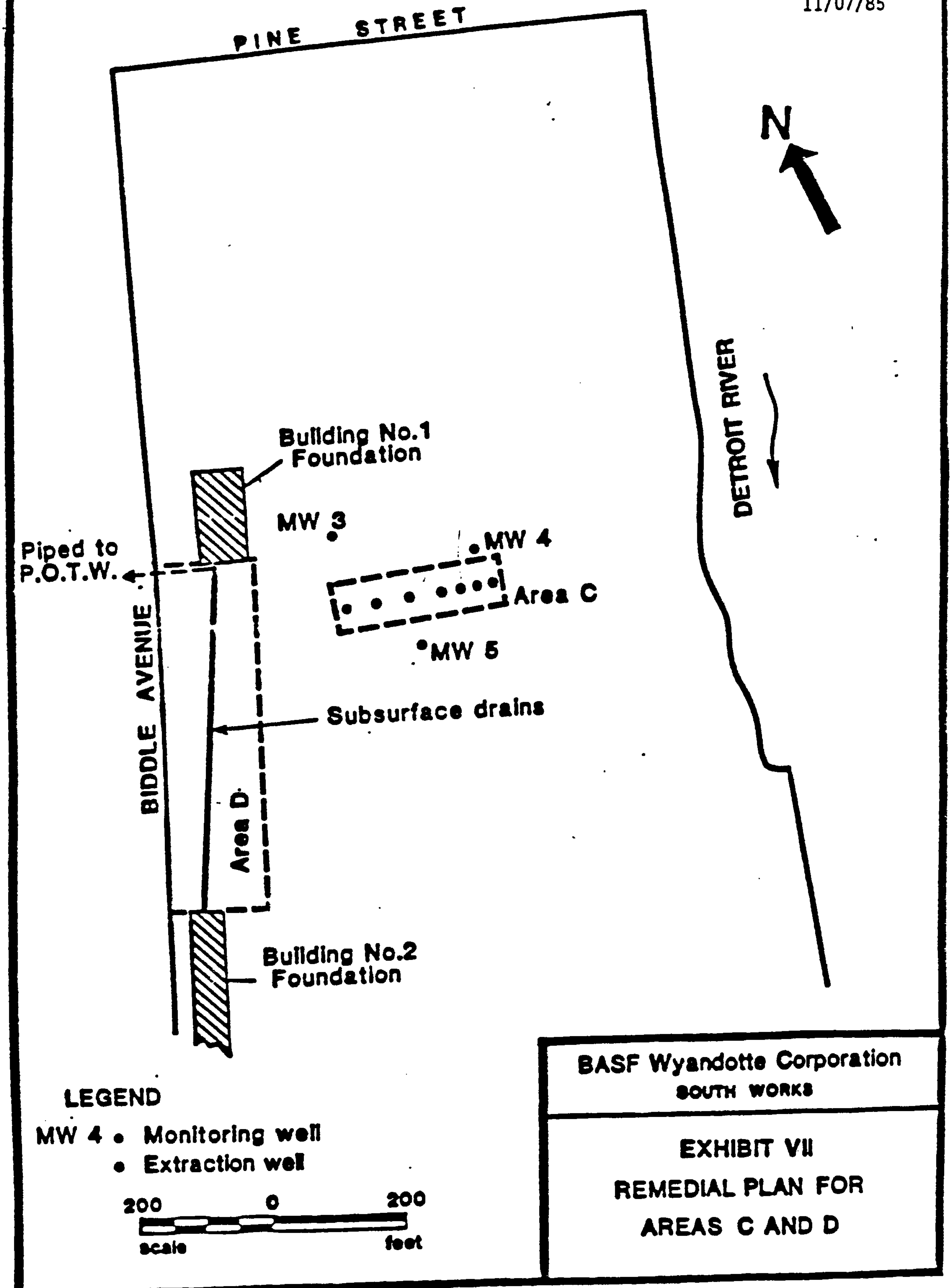
11/07/85



BASF Wyandotte Corporation
SOUTH WORKS

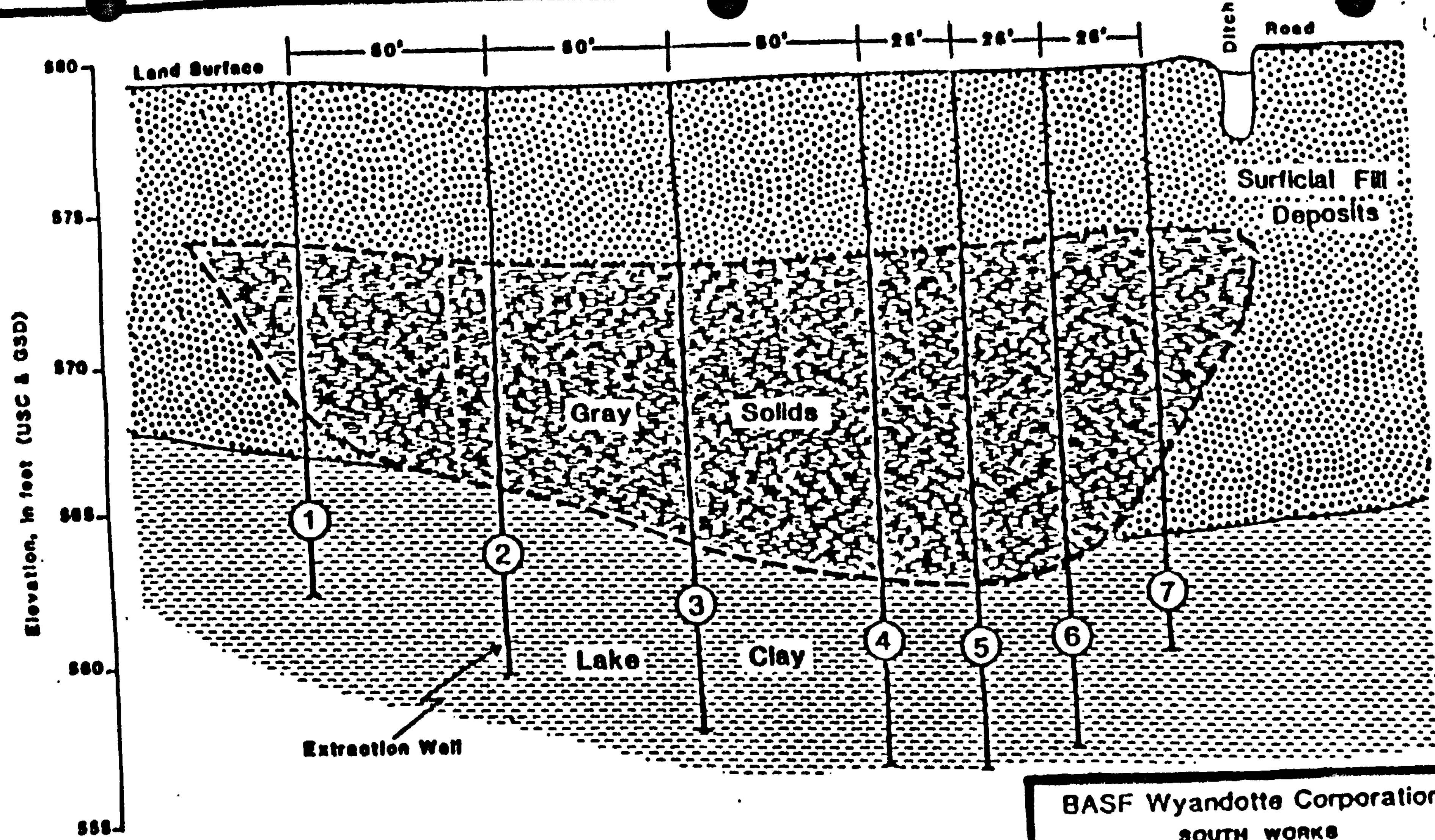
EXHIBIT VI
CONSTRUCTION DETAILS
OF EXTRACTION WELLS
AREA B

11/07/85



BASF Wyandotte Corporation
SOUTH WORKS

EXHIBIT VII
REMEDIAL PLAN FOR
AREAS C AND D



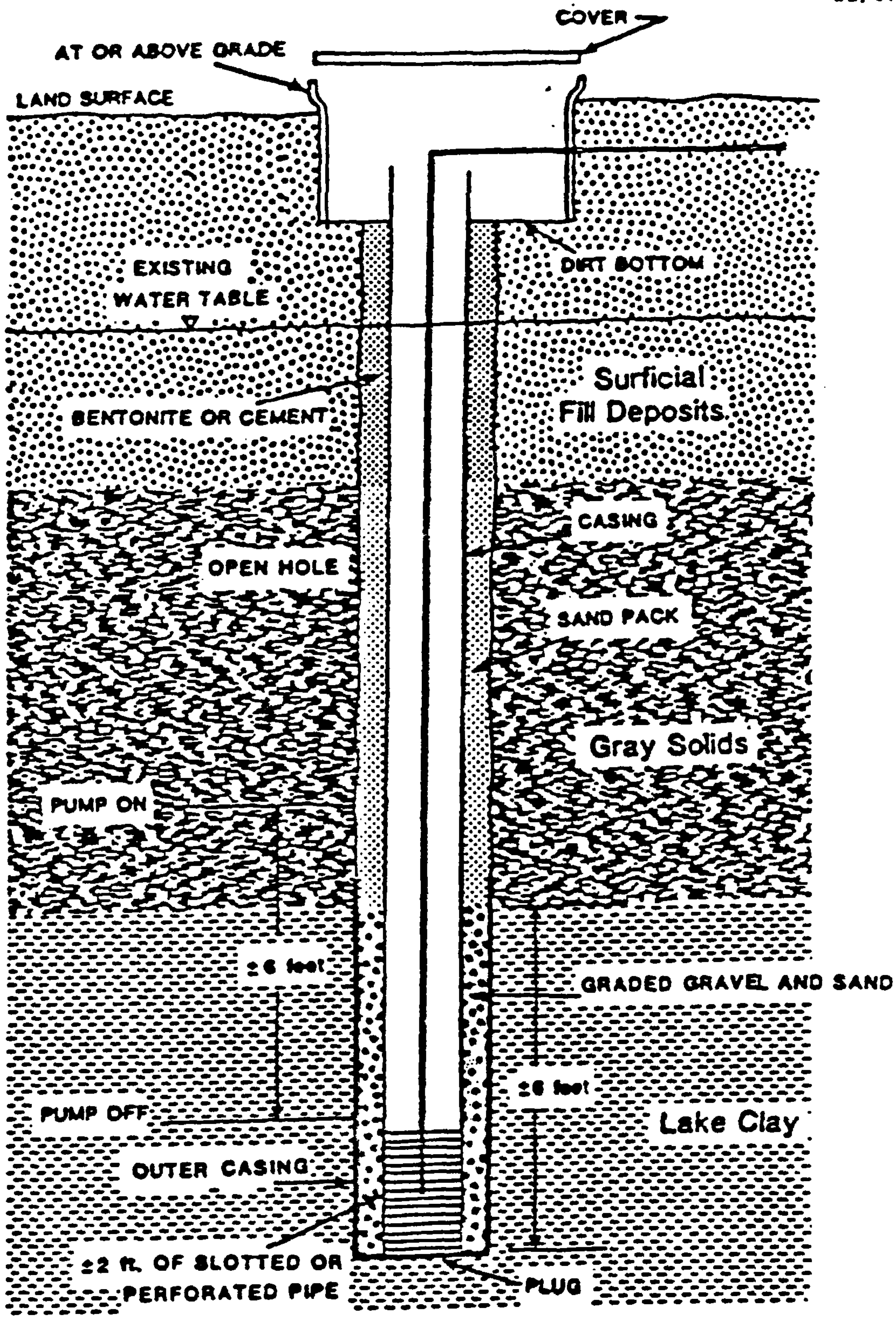
NOTE : See Exhibit IX for extraction well construction details.

BASF Wyandotte Corporation
SOUTH WORKS

EXHIBIT VIII
PROFILE ALONG LINE
OF WELLS-AREA C

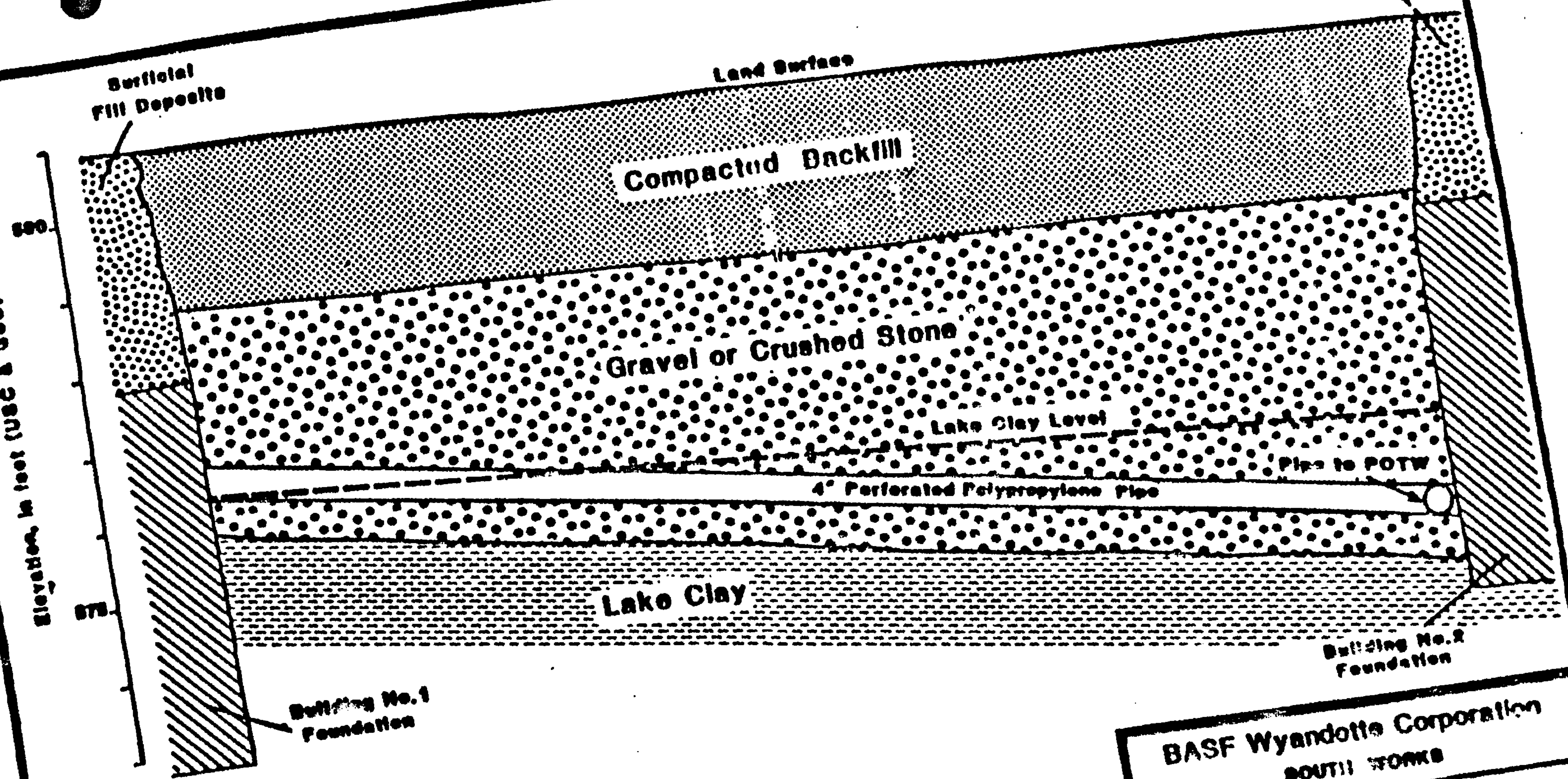
11/07/85

11/07/85



BASF Wyandotte Corporation
SOUTH WORKS

EXHIBIT IX
CONSTRUCTION DETAILS
OF EXTRACTION WELLS
AREA C

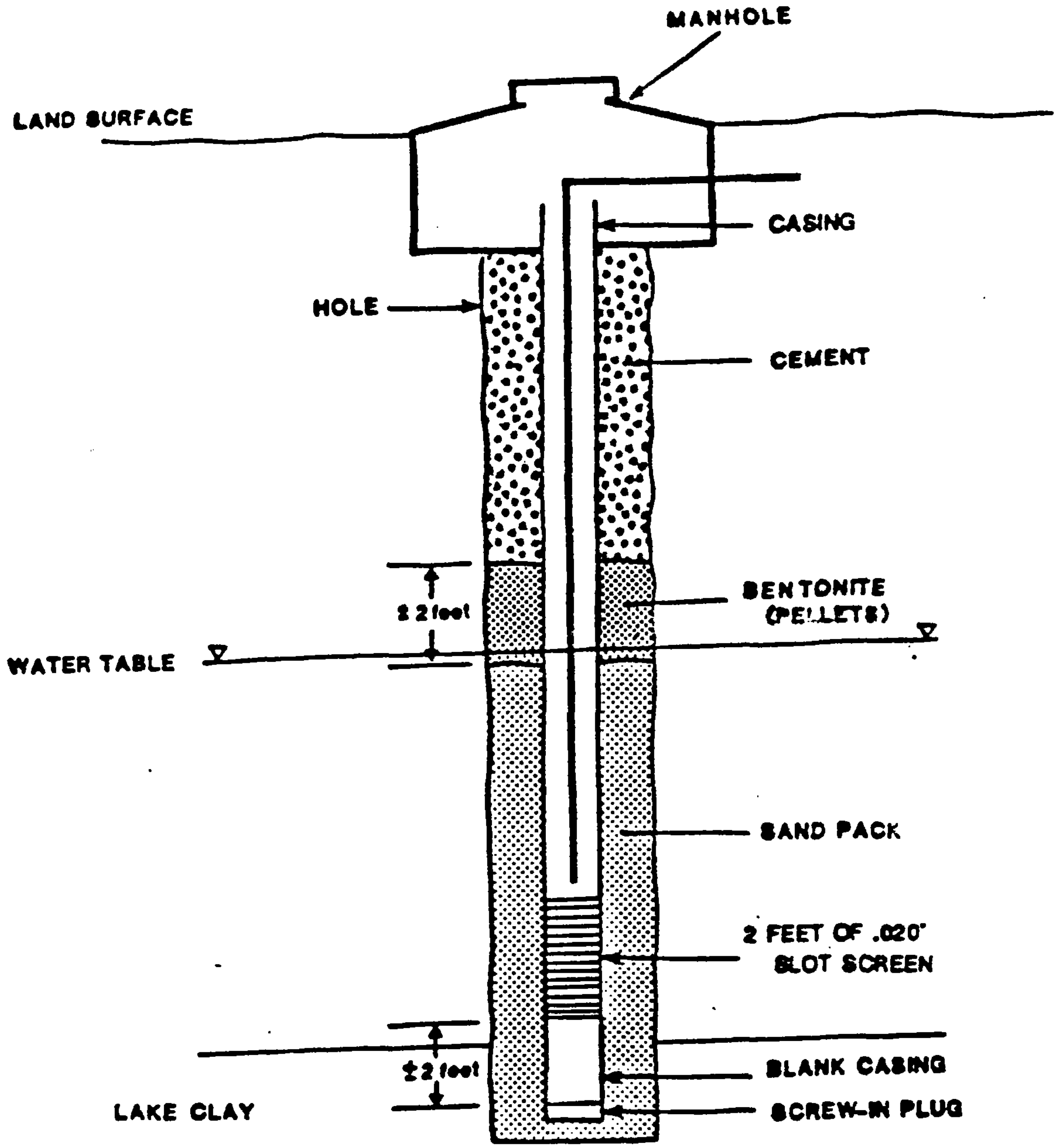


BASF Wyandotte Corporation
SOUTH WORKS

EXHIBIT X
PROFILE ALONG
DRAIN – AREA D

11/07/85

11/07/85



BASF Wyandotte Corporation
NORTH WORKS

EXHIBIT V
CONSTRUCTION DETAILS
OF EXTRACTION WELLS

APPENDIX E

WASTEWATER DISCHARGE PERMIT

WAYNE COUNTY OFFICE OF PUBLIC SERVICES
DEPARTMENT OF PUBLIC WORKS
415 CLIFFORD STREET
DETROIT, MICHIGAN 48226

CLASS D WASTEWATER DISCHARGE PERMIT

Permit No. D11311
Expiration Date 2-14-92

Permittee Name BASF Corporation
Address of Premise Discharging Wastewater 1609 Biddle Avenue
Wyandotte, MI 48192

Permittee Mailing Address same

Permittee Contact(s) Dale Roush Phone 246-6106

Standard Industrial Classification Code (SIC) 2810, 2090, 2860, 2891, 3079

The above named Permittee is hereby authorized to discharge wastewater into the Wayne County Wastewater Facilities, subject to the terms and conditions specified herein:

1. Payment of an **ANNUAL SURVEILLANCE FEE** of $ 525.00 which shall be subject to revision as determined by the Wayne County Department of Public Works, with payment due on 2-15-87 as per Item 3 of the terms and conditions contained herein.

2. Compliance with all General Discharge Prohibitions set forth in Article V of the Wayne County Sewer Use Ordinance, dated March 20, 1986, as ammended.

3. Terms and Conditions of Permit, items 1-15, attached herewith.

4. Compliance with the Parameter, Discharge, Monitoring, and Reporting Requirements and Compliance Schedule contained herein.

VERIFICATION OF PERMIT:
Name of Community City of Wyandotte
Signature of Official
Title
Date

AUTHORIZATION OF PERMIT: Wayne County Department of Public Works
Signature of Official [illegible signature]
Title Deputy Director - Dept of Public Wks
Date 2/16/87

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

TERMS AND CONDITIONS OF PERMIT NO. D-11311

1. The conditions of the Wastewater Discharge Permit shall be uniformly enforced by the Director in accordance with the provisions set forth in Article V of the Sewer Use Ordinance as established by the Department of Public Works.

2. A wastewater questionnaire shall be filed with the Department prior to approval of the Permit. Based on the information obtained through surveillance programs initiated by the Department, an annual surveillance fee shall be calculated according to the schedule established by the Department.

3. The permittee shall agree to pay to the local municipality the regular wastewater service charges, annual surveillance fees, and surcharges as established by the Department and/or local municipality having jurisdiction.

4. Class D Wastewater Discharge Permits must be renewed: (a) every five (5) years; (b) whenever the use of a new parameter not reported in the previous permit is proposed to be discharged; or, (c) when the amount of wastewater discharged increases by more than 50% from that reported in the previous permit.

5. The permittee shall apply for a permit renewal at least 180 days prior to expiration date of this permit.

6. The terms and conditions of the Permit may be subject to modification or change by the Department during the life of the Permit as limitations or requirements as identified in Article V of the Sewer Use Ordinance are modified and changed. The permittee shall be informed of any proposed changes in his Permit at least 30 days prior to the effective date of change. Any changes or new conditions in the Permit shall include a reasonable time schedule for compliance.

7. The permittee shall agree to furnish the Department, upon request, any additional information relating to the installation or use of the sewer for which this permit is sought.

8. The permittee shall agree to properly operate and maintain any industrial wastewater pretreatment facilities, as may be required as a condition of the acceptance into the public sewer of the industrial wastes involved, in an efficient manner at all times, and at no expense to the County.

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

TERMS AND CONDITIONS OF PERMIT NO. D-11311

9. The permittee shall agree to cooperate with the Department or its representatives in their inspecting, sampling and study of wastes or facilities provided for pretreatment.

10. The permittee shall agree to notify the Department immediately of any accident, negligence breakdown of pretreatment equipment or other occurrence that allows discharge into the sewer system of any wastes or process waters not covered by this permit.

11. The permittee shall notify the Department immediately upon the occurrence of a "slug" loading (or accidental discharge) to the county sewer system. This "slug" could be at a flow rate and/or pollutant concentration which will cause interference with the POTW or a passthrough. The notification shall include location of discharge, date and time thereof, type of waste, concentration and volume, and corrective actions taken.

    The permittee who discharges "slugs", or accidental discharges shall be liable for any expense, loss or damage to the POTW, in addition to the amount of any fines imposed by the Department on account thereof under State or Federal law.

12. Wastewater Discharge Permits are issued to a specific user for a specific operation. The permit shall not be reassigned, transferred or sold to a new owner or to different premises.

13. It is understood and agreed that the permit and rights granted herein are subject to revocation, after notice and an opportunity for a hearing, for the following reasons:

    1. Violation of the terms and conditions set forth, attached, and made a part of this permit.

    2. Violation of any applicable local ordinances, Wayne County Sewer Use Ordinance, or applicable State and Federal laws, statutes, or regulations.

    The notice of revocation shall set forth specifically the grounds for which the revocation is sought, a place and time for a hearing, granting the permittee a reasonable time to prepare. The permittee hereby agrees that notice may be perfected by certified mail, postage prepaid and properly addressed to the permittee at the address listed in this permit, subject to requirements of the enforcement procedures adopted by the Wayne County Department of Public Works.

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

TERMS AND CONDITIONS OF PERMIT NO. D-11311

14. It is further understood, that a violation of any of the terms or conditions of this permit may, after notice and opportunity for a hearing, operate to suspend and annul any and all rights acquired under this permit and the permit holder shall surrender the permit and cease any operations and remove any connection made pursuant to this permit.

15. Additional Comments:

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

PRETREATMENT REQUIREMENTS OF PERMIT NO. D-11311

All Pretreatment Standards set forth by the Environmental Protection Agency for this type of industry shall be conditions of this permit. In addition, all Wayne County regulations regarding discharge to the Wayne County Metropolitan Sewerage System, set forth in Article V of the Wayne County Sewer Use Ordinance (S.U.O.) shall apply. When limitations set forth in Article V and Appendix A are exceeded, the discharge may be acceptable upon payment of a surcharge as set forth in the Schedule of Rates.

Regarding the regulations set forth in Article V, the following limitations shall apply:

I. PARAMETER REQUIREMENTS

A. North Works (Combined Discharge at Alkali St.)

Parameter	Limitation	Requirements
pH	5.0 - 9.5 (for grab sample)	Compliance with the limitations specified.
	6.5 - 8.0 (daily ave.)	

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

PRETREATMENT REQUIREMENTS OF PERMIT NO. D-11311

II. DISCHARGE CONDITIONS

1. Discharge of groundwater from the North and South Works will be permitted. The North Works groundwater shall be pretreated by an activated carbon system prior to entering the Wayne County Sanitary Sewer System.

   The South Works groundwater shall come from extraction wells and be collected at two (2) main areas prior to entering the Wayne County Sanitary Sewer System.

2. Permittee agrees to immediately cease all pumping of groundwater to the sanitary sewer system if conditions at the Wyandotte Plant (POTW) warrant such action. This would be a temporary situation such as during a plant upset, power failure, etc....

3. If it is determined that the Wyandotte POTW can no longer accept the groundwater wastewater, the permittee will be given at least a 45 day notice before they will be required to discontinue pumping the groundwater into the Wayne County Sanitary Sewer System.

4. The discharge of groundwater shall be permitted on a year around basis except during wet weather conditions and subsequently shall be coordinated with Wayne County Laboratory personnel (Otis Walker at 285-5217).

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

III. MONITORING REQUIREMENTS OF PERMIT NO. D-11311

Sample Location	Parameter	Frequency	Limitation
North Works Groundwater Pretreatment System Effluent	Flow	Daily	72,000 GPD
	1,2-Dichloropropane	1/Mo Grab	
	1,2-Dichloroethane	1/Mo Grab	
North Works Combined Discharge at Alkali St.	(2) 1,1,1-trichloroethane	2/Yr Grab	
	(2) Toluene	2/Yr Grab	
	(3) Benzene	2/Yr Grab	
South Works Groundwater Collection Systems I&II	Flow	Daily	43,200 GPD
South Works Groundwater Collection System I	1,2-Dichloropropane	1/Mo Grab	
	Tetrachloroethylene	1/Mo Grab	
	Hexachlorobenzene	1/Mo Grab	
	Carbon tetrachloride	1/Mo Grab	
	Chloroform	1/Mo Grab	
South Works Groundwater Collection System II	1,2-Dichloropropane	1/Mo Grab	
	Trichloroethylene	1/Mo Grab	
	Hexachlorobenzene	1/Mo Grab	
	Hexachlorobutadiene	1/Mo Grab	
	Tetrachloroethylene	1/Mo Grab	
	Chloroform	1/Mo Grab	

(1) BASF may discontinue the analysis of any parameter for any collection system when the analytical results are less than 10 mg/l for six (6) consecutive sampling periods. BASF shall notify the Wayne County Department of Public Works thirty (30) days in advance of its intent to discontinue any sampling or analysis.

(2) Following Windshield Adhesive Plant startup.

(3) Following Expanded Polypropylene Plant startup.

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

PRETREATMENT REQUIREMENTS OF PERMIT NO. D-11311

IV. COMPLIANCE SCHEDULE (North Works)

Permittee shall submit the attached Compliance Certification Statement within thirty (30) days of the effective date of this permit. The following compliance sampling criteria shall apply:

Parameters, per Requirements, P.5	Sample Type	Sample Frequency	Sampling Duration
pH	grab	2/day	4 consecutive normal operating days.

If the permittee is determined to be in noncompliance and a variance (See Section 2.03 (a)(5) of the Wayne County Sewer Use Ordinance) is not granted, a mutually acceptable compliance schedule shall be developed using the parameters listed below:

		Date
a.	Hire Engineer (If Necessary)	
b.	Submit proposal/plans	Within 60 days of effective date of this permit.
c.	Equipment ordered	
d.	Equipment received	
e.	Installation started	
f.	Installation completed	
g.	System on-line	Within 12 months from submittal of compliance plans (b.)
h.	Compliance achieved	Within 45 days of System On-line (g.)

WAYNE COUNTY DEPARTMENT OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

PRETREATMENT REQUIREMENTS OF PERMIT NO. D-11311

V. REPORTING REQUIREMENTS

1. A six-month report will be due during the month of June 1987 from the permittee. This is required per 40 CFR Ch. I (7-1-85 edition) Part 403.12e, entitled "Periodic reports on continued compliance". Thereafter, the report will be due during December and June of every year. This report shall indicate the nature and concentration of pollutants in the effluent which are limited by Categorical Pretreatment Standards or by the Wayne County Sewer Use Ordinance. Also, "this report shall include a record of measured or estimated average and maximum daily flows for the reporting period..... ." The report shall also summarize the self-monitoring data required by this Permit.

2. Self-monitoring Reports shall be submitted to the WCDPW on a monthly basis.

3. A tabulation of pumping activities for the month, and the year to date totals, shall be submitted to the WCDPW on a monthly basis.

4. The permittee shall submit a special report, describing the activated carbon pretreatment system for the North Works, to the Wayne County Department of Public Works within 30 days of the effective date of this permit.

BASF Corporation
Chemicals Division

BASF

February 29, 1988

Mr. Daniel R. Helm, Engineer
Wayne County Dept. of Public Works
797 Central Avenue
Wyandotte, MI 48192

Dear Mr. Helm:

Re: BASF Corporation Chemicals Division
Permit No. D 11311, Reporting Requirements

Confirming our January 12, 1988 phone conversation, your department considers the BASF Corporation Chemicals Division monthly report format does include the information required by the six (6) month reporting requirement specified in Section V of the reference permit.

I have taken an extra step for your convenience and have developed the attached data table which summarizes on a single page the self-monitoring data BASF has collected. As you can see, the data clearly indicates BASF's continuing compliance to Permit D 11311 requirements. In fact, the conditions (reference permit Section III, Notation (1) which allow BASF to discontinue regular organic chemical analysis on practically all of the discharges have been attained.

Therefore, BASF hereby notifies your office that it intends to discontinue, for the purposes of meeting D 11311 permit requirements, all sampling and analysis of groundwaters which have met conditions described in Section III, Notation (1), page 7.

Yours very truly,

Dale Roush

H. D. Roush
Manager
Quality Assurance and
Environmental Affairs

mh
att.

cc: T. Galloway

bc: LAAnderson, DPThiel

BASF CORPORATION CHEMICALS DIVISION

PERIODIC REPORT ON CONTINUED COMPLIANCE

JULY - DECEMBER 1987

Sample Location	Parameter Units, mg/l		July	Aug.	Sept.	Oct.	Nov.	Dec.
North Site Combined Discharge @ Alkali Street	pH		7.0	7.0	7.8	7.6	9.1	8.8
	1,1,1-Trichloroethane							
	Toluene						ND	ND
	Benzene						ND	ND
North Site Pretreatment System Effluent	Flow (Kgal./D)		17.3	17.8	7.4	23.2	17.1	19.3
	1,2-Dichloropropane	(None	(ND)	ND	ND	ND	ND	ND
	1,2-Dichloroethane	Detected)	ND	ND	ND	ND	ND	ND
South Site Groundwater Systems I and II	Flow (Kgal./D)		23.5	18.8	7.9	21.5	14.0	23.5
South Site Groundwater System I	1,2-Dichloropropane		ND	ND	ND	ND	ND	ND
	Tetrachloroethylene		ND	ND	ND	ND	ND	ND
	Hexachlorobenzene		ND	ND	ND	ND	ND	ND
	Carbon Tetrachloride		ND	ND	ND	ND	ND	ND
	Chloroform		ND	ND	ND	ND	ND	ND
System II	1,2-Dichloropropane		32	24	ND	55	100	151
	Trichloroethylene		ND	1	181	73	2	ND
	Hexachlorobenzene		1	1	ND	ND	ND	ND
	Hexachlorobutadiene		ND	3	ND	ND	ND	ND
	Tetrachloroethylene		5	ND	7	2	ND	1
	Chloroform		2	ND	ND	ND	ND	2

APPENDIX F

FINANCIAL RESPONSIBILITY

. BASF Corporation

BASF

Frederick W. Bernthal
Executive Vice President
Finance

March 31, 1987

Hazardous Waste Division
Environmental Protection Bureau
Department of Natural Resources
P.O. Box 30028
Lansing, MI 48909

Dear Sirs:

I am the chief financial officer of BASF Corporation, 8 Campus Drive, Parsippany, New Jersey, 07054. This letter is in support of the use of the financial test to demonstrate financial responsibility for the liability coverage and closure and/or post closure care as specified in Subpart H of 40 CFR Parts 264 and 265.

The firm identified above is the owner or operator of the following facilities for which liability coverage for sudden accidental occurrences is being demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265:

Facility Address	EPA ID No.	Sudden Accidental Pollution Liability Coverage (Individual Incident/Annual Aggregate)
Dinuba Agricultural Station 10181 Avenue 416 Dinuba, CA 93618	CAT000646117	$1,000,000/2,000,000
Columbia Ave. Facility 491 Columbia Ave. Holland, MI 49423	MID006411953	$1,000,000/2,000,000

Facility Address	EPA ID No.	Sudden Accidental Pollution Liability Coverage (Individual Incident/Annual Aggregate)
Milford Works 5935 Milford Avenue Detroit, MI 48210	MID001868538	$1,000,000/2,000,000
Wyandotte Works 1609 Biddle Avenue Wyandotte, MI 48192	MID064197742	$1,000,000/2,000,000
Belvidere Works James Street Belvidere, NJ 07823	NJD082988056	$1,000,000/2,000,000
FDO Clifton Works 85 Third Street Clifton, NJ 07015	NJDO02155067	$1,000,000/2,000,000
Hawthorne Works 150 Wagaraw Road Hawthorne, NJ 07506	NJD002165371	$1,000,000/2,000,000
Kearny Works 50 Central Avenue So. Kearny, NJ 07032	NJD046941530	$1,000,000/2,000,000
Enka Works Sand Hill Road Enka, NC 28728	NCD052813250	$1,000,000/2,000,000
Agricultural Research Center P.O. Box 13528 Research Triangle Park, NC 27709	NCD139687974	$1,000,000/2,000,000
Clemson Works P.O. Box 488 Central, SC 29630	SCD052944295	$1,000,000/2,000,000
Whitestone Works P.O. Box 2108 Spartanburg, SC 29302	SCD077990638	$1,000,000/2,000,000
Freeport Works 602 Copper Road Freeport, TX 77541	TXD008081697	$1,000,000/2,000,000

Facility Address	EPA ID No.	Sudden Accidental Pollution Liability Coverage (Individual Incident/Annual Aggregate)
Williamsburg Works P.O. Drawer D Williamsburg, VA 23187	VAD990710642	$1,000,000/2,000,000
Huntington Works 24th St. & 5th Ave. Huntington, WV 27522	WVD000068601	$1,000,000/2,000,000

The firm identified above guarantees, through the corporate guarantee specified in Subpart H of 40 CFR Parts 264 and 265, liability coverage for sudden accidental occurrences at the following facilities owned or operated by the following subsidiaries of the firm: NONE.

1. The firm identified above owns or operates the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by the test are shown for each facility:

Facility Address	EPA ID No.	Current Closure Cost Estimate
Columbia Agricultural Facility 491 Columbia Avenue Holland, MI 49423	MID006411953	$59,560
Milford Works 5935 Milford Avenue Detroit, MI 48210	MID001868538	$44,780
Wyandotte Works 1609 Biddle Avenue Wyandotte, MI 48192	MID064197742	$121,100

2. The firm identified above guarantees, through the corporate guarantee specified in Subpart H of 40 CFR Parts 264 and 265, the closure and post-closure care of the following facilities owned or operated by its subsidiaries. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility: NONE.

3. In States where EPA is not administering the financial requirements of Subpart H of 40 CFR Parts 264 and 265, this firm is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by such a test are shown for each facility:

Facility Address	EPA ID No.	Current Closure Cost Estimates
Dinuba Agricultural Station 10181 Avenue 416 Dinuba, CA 93618	CAT000646117	$25,160
Enka Works Sand Hill Road Enka, NC 28728	NCD052813250	$22,600
Agricultural Research Center P.O. Box 13528 Research Triangle Park, NC 27709	NCD139687974	$150,000
Clemson Works P.O. Box 488 Central, SC 29630	SCD052944295	$12,000
Whitestone Works P.O. Box 2108 Spartanburg, SC 29302	SCD077990638	$40,500
Freeport Works 602 Copper Road Freeport, TX 77541	TXD008081697	$558,300

Facility Address	EPA ID No.	Current Closure Cost Estimates
Williamsburg Works P.O. Drawer D Williamsburg, VA 23187	VAD990710642	$11,300
Huntington Works 24th St. & 5th Avenue Huntington, WV 27522	WVD000068601	$17,600

4. The firm identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanisms specified in Subpart H of 40 CFR Parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: NONE.

5. This firm is the owner or operator of the following UIC facilities for which financial assurance for plugging and abandonment is required under Part 144. The current closure cost estimates as required by 40 CFR 144.62 are shown for each facility:

Facility Address	Well ID No.	Current Closure Cost Estimate
Geismar Works P.O. Box 457 Geismar, LA 70734	D-2A	$61,000
Holland Works 471 Howard Avenue Holland, MI 49423	MI-139-1W-0001	$16,000
Holland Works 471 Howard Avenue Holland, MI 49423	MI-139-1W-0002	$16,000
Freeport Works 602 Copper Road Freeport, TX 77541	WDW-51	$93,720
Freeport Works 602 Copper Road Freeport, TX 77541	WDW-99	$96,920

This firm is not required to file a form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended December 31, 1986.

Closure or Post-Closure Care and Liability Coverage

ALTERNATIVE I
(000's)

1.	Sum of current closure and post-closure cost estimates (total of all cost estimates listed above)	$1,347
2.	Amount of annual aggregate liability coverage to be demonstrated	$30,000
3.	Sum of lines 1 and 2	$31,347
*4.	Total liabilities	$1,253,547
*5.	Tangible net worth	$881,477
*6.	Net worth	$922,971
*7.	Current assets	$1,142,440
*8.	Current liabilities	$739,317
9.	Net working capital (line 7 minus line 8)	$403,123
*10.	The sum of net income plus depreciation, depletion, and amortization (including amortization of capitalized interest of $7,548)	$438,428
11.	Total assets in U.S. (required only if less than 90% of assets are located in the U.S.)	N/A

		YES	NO
12.	Is line 5 at least $10 million?	X	
13.	Is line 5 at least 6 times line 3?	X	
14.	Is line 9 at least 6 times line 3?	X	
15.	Are at least 90% of assets located in the U.S.? If not, complete line 16.	X	
16.	Is line 11 at least 6 times line 3?	N/A	
17.	Is line 4 divided by line 6 less than 2.0?	X	
18.	Is line 10 divided by line 4 greater than 0.1?	X	
19.	Is line 7 divided by line 8 greater than 1.5?	X	

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(g) as such regulations were constituted on the date shown immediately below.

Frederick W. Bernthal
Executive Vice President Finance
BASF Corporation
March 31, 1987

APPENDIX A

EXHIBIT 3

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

Delbert Rector ~~DAVID F. HALES~~, Director

June 27, 1991

Mr. H. D. Roush, Manager
Quality & Ecology Services Department
BASF Corporation
Chemicals Division
1609 Biddle Avenue
Wyandotte, Michigan 48192

Dear Mr. Roush:

SUBJECT: Closure of Hazardous Waste Container Storage Unit
BASF Corporation, MID 064 197 742

The Michigan Department of Natural Resources (MDNR), Waste Management Division (WMD), has completed a review of the hazardous waste container storage unit closure plan/certification submitted by BASF Corporation (BASF), pursuant to Michigan's Hazardous Waste Management Act, 1979 P.A. 64, as amended (Act 64). The closure plan/certification was submitted on November 8, 1988. Based on this review, the WMD has determined that the cleanup activities associated with the closure of the container storage unit and the closure plan/certification fail to demonstrate clean closure in accordance with the closure performance standard established in R 299.9601 of the Act 64 administrative rules, and 40 CFR §§265.111 and 265.197. Therefore, a clean closure determination is denied. The WMD recognizes the status of the container storage unit as closed.

Financial Capability Requirements for Closure

Since the container storage unit has been closed, BASF is hereby released from the financial capability requirements for closure assurance and liability coverage under Part 7 of the Act 64 administrative rules. BASF is therefore no longer required to use the financial test to demonstrate financial capability for closure of this facility.

Post-Closure Requirements

Facilities failing to close in accordance with the closure performance standard are required to comply with the post-

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JUL 2 1991

closure requirements of 40 CFR §§265.117 - 265.120, and Part 7 of the Act 64 administrative rules. However, BASF is also subject to the requirements of Consent Decree #80-73699 entered between the State of Michigan and BASF in Federal District Court on November 12, 1985. Inquiries with MDNR, Environmental Response Division staff, indicate that BASF is in compliance with the Consent Decree at this time. BASF must maintain compliance with the Consent Decree. Therefore, the WMD is not requiring BASF to submit a post-closure plan and comply with the other post-closure requirements referenced above at this time.

Corrective Action Responsibilities

BASF is advised that this release of financial capability requirements for the closure of the container storage unit does not release the company from any corrective action responsibilities under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984. Questions regarding BASF's corrective action responsibilities should be directed to Mr. Rich Traub, Chief, Michigan Section of the RCRA Permitting Branch, Region 5, U.S. Environmental Protection Agency, at telephone number 312-886-6136.

Please contact Ms. Ronda L. Hall, Environmental Engineer, Waste Management Division, at 517-373-9548, if you have any questions.

Sincerely,

Del Rector

Delbert Rector
Director
517-373-2329

cc: Mr. Adam Bickel, BASF
Ms. Lorraine Kosik, U.S. EPA
Mr. Rich Traub, U.S. EPA
Mr. Steve Buda, DNR
Ms. Ronda L. Hall, DNR
Mr. Dave Slayton, DNR
Ms. JoAnn Merrick, DNR
Mr. Tom Sampson, DNR
Mr. Charles San Juan, DNR
HWP/C&E File

APPENDIX B

EXHIBIT 1

INSPECTION CHECK LIST FOR WASTE STORAGE AREA

Inspector Name: J. M. Moote

Date: Dec 29, 86

Item Inspected:	Status (1) S	Status (1) U	Description of Unsatisfactory Status
1. Damaged or leaking drums	✓		
2. Chemical spills on floor	✓		
3. Improper or unsafe stacking of drums	✓		
4. Discolored rain water in dike	✓		
5. Level of water in dike (if needs to be pumped out)	✓		
6. General housekeeping status	✓		
7. Unlabeled materials in the containment dike area	✓		
8. Dike/floor deterioration	✓		

(1) S (Satisfactory); U (Unsatisfactory)

J. M. Moote

Signature of Inspector

Upon completion of inspection please forward to Research Waste Disposal Chairman

WASTE CRIB INSPECTION LOGSHEET

	W101	W103	W100	W102	W104	W105	W152	W015	W013
Outside clean?	YES--	------	------	------	------	------	------	------	-YES
Ground wire on?	**	**	YES--	------	------	------	-YES	**	**
Funnel clean?	YES--	------	------	------	------	-YES	**	**	YES
Label correct?	YES--	------	------	------	------	------	------	------	-YES
Drum spills?	NO---	------	------	------	------	------	------	------	-NO
Any leakage?	NO---	------	------	------	------	------	------	------	-NO
How full (%)?	MT	MT	55%	38%	MT	50%	MT	80%	34%
Start fill date?	4/12	4/12	3/21	3/21	4/12	4/12	4/18	3/9	4/8
New drum needed?	NO---	------	------	------	------	------	------	------	-NO

GENERAL QUESTIONS:

Has anything collected in the dike? NO

Is the dike in good repair? YES

Was the crib properly locked? YES

Are any extraneous materials in the crib? NO

List each drum removed and the previous contents of the replacement drum.

LIST ANY ACTION YOU TOOK TO CORRECT CONDITIONS IN THE CRIB ON BACK OF THIS SHEET.

Inspected by [illegible] Date 4-18-94

Read & understood by [illegible] Date 4-26-94

APPENDIX B

EXHIBIT 2

BASF Corporation
Chemicals Division

BASF

CERTIFIED MAIL - RETURN RECEIPT
REQUESTED: P 803 601 591

October 11, 1988

Mr. Alan Howard
Michigan Department of Natural Resources
Waste Management Division
P. O. Box 30028
Lansing, MI 48909

Dear Mr. Howard:

In November of 1980, BASF Corporation, Chemicals Division (BASF) in Wyandotte, Michigan provided Federal/State environmental agencies with the appropriate notification and application forms to be granted Interim Status for operation of a hazardous waste Treatment, Storage, or Disposal (TSD) facility under the Resource Conservation and Recovery Act (RCRA). These documents were submitted as a "protective filing," as BASF desired to be in full compliance with the newly promulgated hazardous waste management regulations.

BASF's TSD Part A application includes two (2) container storage areas and a 4,000-gallon tank. It has come to the attention of BASF that one of the two drum storage areas and the 4,000-gallon tank should have either not been included on the application or the application should have been subsequently amended to delete those items. The reasons for our opinion on this matter are listed below:

- <u>100 Cubic Yard Container Storage Area</u>

  The Research & Development facilities of the Wyandotte complex are located on the west side of the BASF property. A storage building is located slightly southeast of these facilities and adjacent to this building is a 6.75 ft. x 26 ft. long concrete pad. The type of hazardous waste materials that BASF has temporarily stored in this area are ignitable wastes ("D" wastes) and wastes from non-specific sources ("F" wastes).

  Since filing the TSD Part A application in November of 1980, BASF has never stored hazardous wastes on the concrete pad described above for a period of time exceeding 90 days. All hazardous wastes stored on the pad were also transported off-site to an appropriately licensed disposal site within 90 days of the date when wastes began accumulating in that area.

- <u>4,000-Gallon Tank</u>

  The subject tank is an in-line component of BASF's Vitamin E manufacturing process. The acetic acid that accumulates in the tank is a by-product of this manufacturing process. The acid is not contaminated with residual chemical constituents (e.g., excessive heavy metals) to the extent that it is unusable. The normal procedure at BASF is to sell the acetic acid to a buyer. BASF believes that when this procedure is followed the material does not meet the definition of "solid waste" provided in 40 CFR 261.2 or (Michigan) Act 64 since the material is not normally discarded.

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

On four occasions in the past 8 years the subject tank became full of acetic acid and BASF did not have a party available to purchase the material. On these occasions BASF completely emptied the tank, manifested the acetic acid as a hazardous waste, and shipped the material off-site for neutralization/disposal. BASF emphasizes that since November of 1980, waste acid could never have been stored in the tank for a period of time exceeding 90 days. The Vitamin E manufacturing process is a continuously operated system and acetic acid is generated at a rate of approximately 185 gallons/operating day. This flow rate is sufficient to fill the 4,000-gallon tank to full capacity within approximately 22 operating days. If the tank becomes full, process operators are required to shut down the system (a condition considered highly undesirable by BASF).

Since November, 1987, a 1-inch diameter process waste pipe has been connected from the subject tank to a neutralization vessel. When a buyer is not available, the acetic acid is pumped to the neutralization vessel, the pH is adjusted, and the resultant solution is discharged to the sanitary sewer (with permission from the local wastewater authority).

BASF respectfully requests that the Michigan Department of Natural Resources (MDNR) amend our current TSD Part A permit application by deleting reference to the 100-cubic yard container storage area and the 4,000-gallon tank on Form 3 Section III. BASF further requests that the MDNR confirm in writing that the permit application has been amended. Notwithstanding any notification to the contrary, BASF will consider that by MDNR receipt of this letter the subject tank will no longer be considered part of our respective TSD Part A permit application.

As a current employee and duly authorized representative of BASF Corporation Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

H. D. Roush
Manager
Quality & Ecology Services Department

mh
atts.

bc: CWAxce
KFry
NEHowe
LRTetzlaff

BASF CORPORATION, CHEMICALS DIVISION
WYANDOTTE, MICHIGAN

AFFIDAVIT STATEMENT

BASF's Vitamin E manufacturing process includes a 4,000-gallon tank as an in-line component vessel. Acetic acid accumulates in the tank as a by-product of the Vitamin E manufacturing process. This acid is not contaminated with residual chemical constituents (e.g., excessive heavy metals) to the extent that it is unusable. Normal BASF procedure is to sell the acetic acid to a buyer.

On four occasions in the past eight years the subject tank became full of acetic acid and BASF did not have a party available to purchase the material. On these occasions BASF completely emptied the tank, manifested the acetic acid as a hazardous waste and shipped the material off-site for neutralization/disposal. BASF emphasizes that since November of 1980, waste acid could never have been stored in the tank for a period of time exceeding 90 days. The Vitamin E manufacturing process is a continuously operated system and acetic acid is generated at a rate of approximately 185 gallons/operating day. This flow rate is sufficient to fill the 4,000-gallon tank to full capacity within approximately 22 operating days. If the tank becomes full, process operators are required to shut down the system (a condition considered highly undesirable by BASF).

Since November 1987, a one-inch diameter process waste pipe has been used to divert this stream to a neutralization vessel. When a buyer for the acetic acid is not available, the acid is pumped to the neutralization vessel, the pH is adjusted, and the resultant solution is discharged to the sanitary sewer.

As a current employee and duly authorized representative of BASF Corporation, Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

L R Tetzlaff

L. R. Tetzlaff
Superintendent - Vitamin E Plant

Date 10/12/88

BASF CORPORATION, CHEMICALS DIVISION
WYANDOTTE, MICHIGAN

AFFIDAVIT STATEMENT

The Research & Development facilities of the Wyandotte complex are located on the west side of the BASF property. A storage building is located slightly southeast of these facilities and adjacent to this building is a 6.75 ft. x 26 ft. long concrete pad. The type of hazardous waste materials that BASF has temporarily stored in this area are ignitable wastes ("D" wastes) and wastes from non-specific sources ("F" wastes).

Since filing the TSD Part A application in November of 1980, BASF has never stored hazardous wastes on the concrete pad described above for a period of time exceeding 90 days. All hazardous wastes stored on the pad were also transported off-site to an appropriately licensed disposal site within 90 days of the date when wastes began accumulating in that area.

As a current employee and duly authorized representative of BASF Corporation, Chemicals Division, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Richard A. Moore (signature) Date October 11, 1988

Richard A. Moore
Safety & Ecology Coordinator - R&D

APPENDIX C

EXHIBIT 1

SWMU - C

HAZARDOUS WASTE ACCUMULATION AREA CLOSURE REPORT

Prepared for:

BASF Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192

MID 064 197 742

September 16, 1993
Revision I

Techna Project Number 00344-01K-001

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HAZARDOUS WASTE ACCUMULATION AREA
CLOSURE REPORT

BASF Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192
MID 064 197 742

1.0 INTRODUCTION

BASF Corporation has prepared this report to document the closure of the Central Waste Accumulation Storage Area (CWASA) at BASF Corporation's Wyandotte, Michigan facility. This report has been prepared in accordance with BASF's approved work plan (Appendix A) and the requirements of 40 CFR 262.34 and Rule 299.9306 of Michigan Public Act 64 of 1979.

The CWASA was operated under "Generator" status from August 1, 1983 until the discontinuation of accumulation activities on June 22, 1992. The CWASA was used for the accumulation of drums and small containers of hazardous waste for less than 90 days prior to transportation for reclamation or disposal. Wastes accumulated in the CWASA included a variety of materials generated from industrial processes, laboratory activities, research and development activities, and incidental spill clean-ups.

Closure activities consisted of an extensive surface cleaning of the CWASA and surrounding areas. This was followed by a sampling and analysis plan designed to verify that the CWASA was successfully decontaminated and to determine if waste management practices during the operation of the CWASA had impacted the accumulation area. After closure, the CWASA will be used for general warehousing and non-waste management activities. The site contact for all inquiries concerning the accumulation area closure program is Mr. Adam Bickel (313-246-6836).

2.0 SITE DESCRIPTION AND HISTORY

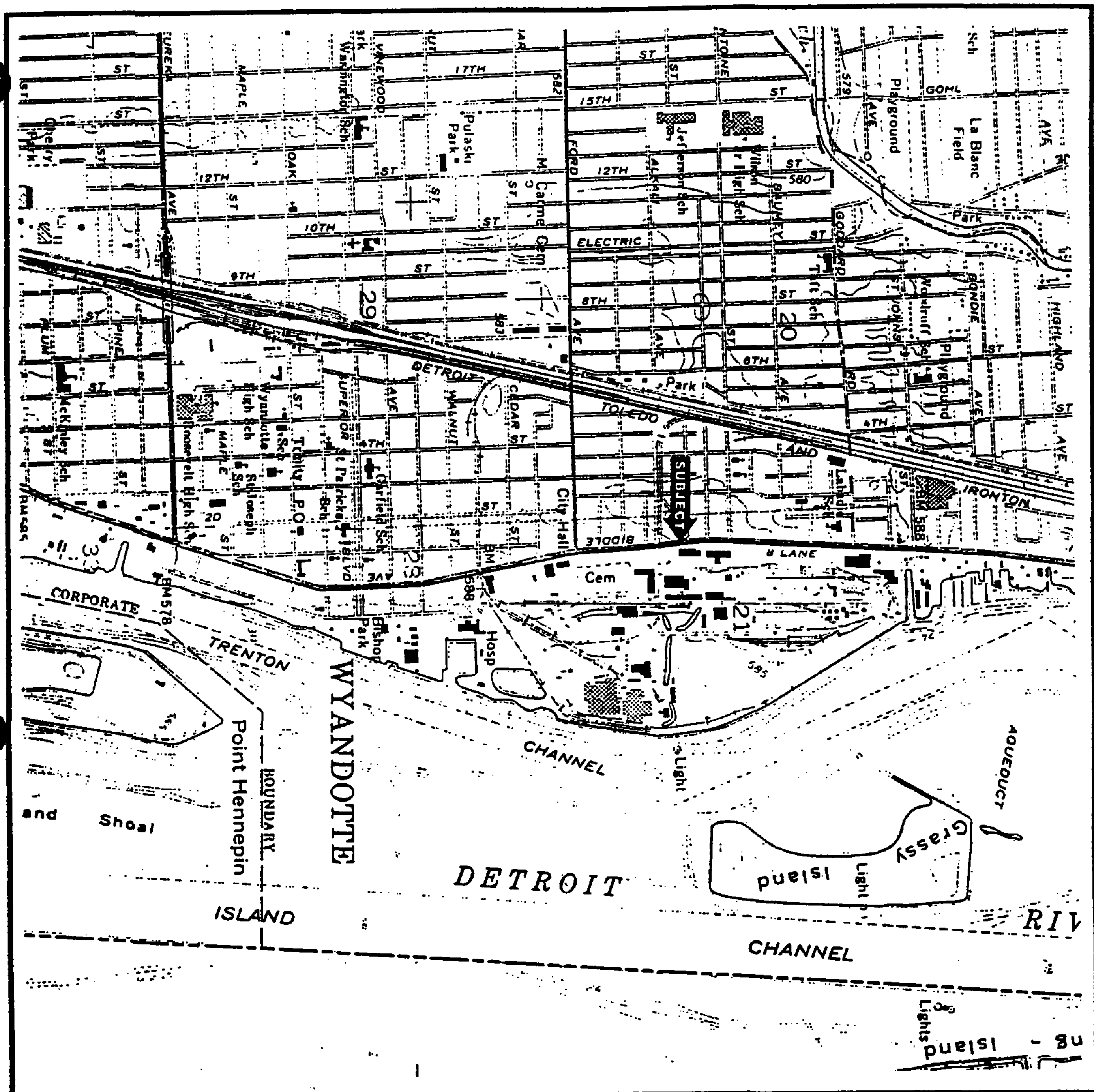
2.1 Location

BASF Corporation is located in southeastern Wayne County at 1609 Biddle Avenue, Wyandotte, Michigan (see Figure 2-1). The CWASA is located in the west-central portion of the subject site inside building 53-M (see Figure 2-2).

2.2 Facility Construction and Usage

The CWASA occupies approximately 2,000 square feet of floor space in an approximately 16,000 square foot building (Figure 2-3). The remaining portions of the structure have been used for general warehousing and other non-waste related activities. The building, identified as building 53-M, is believed to have been constructed in the early 1890s. The walls are of masonry (concrete and brick) construction, and there is a continuous concrete slab floor. All waste management activities were conducted on impermeable surfaces within the totally enclosed facility. The maximum capacity of the CWASA was limited to 450 drums.

The CWASA is divided into nine bays by poured concrete partitions (Figure 2-4). The partitions range in height from two inches at the shallowest, northern portion of the CWASA to 12 inches at the deepest, central portion of each bay. Prior to the initiation of waste accumulation activities, the existing floor of the CWASA was scarified and mortared with a low permeability cementitious grout. The floor of the CWASA was subsequently sealed with a chemically resistant coating. Application of the floor coating was repeated periodically throughout the operating life of the CWASA.



SCALE 1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

MICHIGAN

QUADRANGLE LOCATION

Source: USGS

Wyandotte, MI–ONT.
7.5 Minute Quadrangle (Photorevised 1981)

TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170
(313) 454–1100

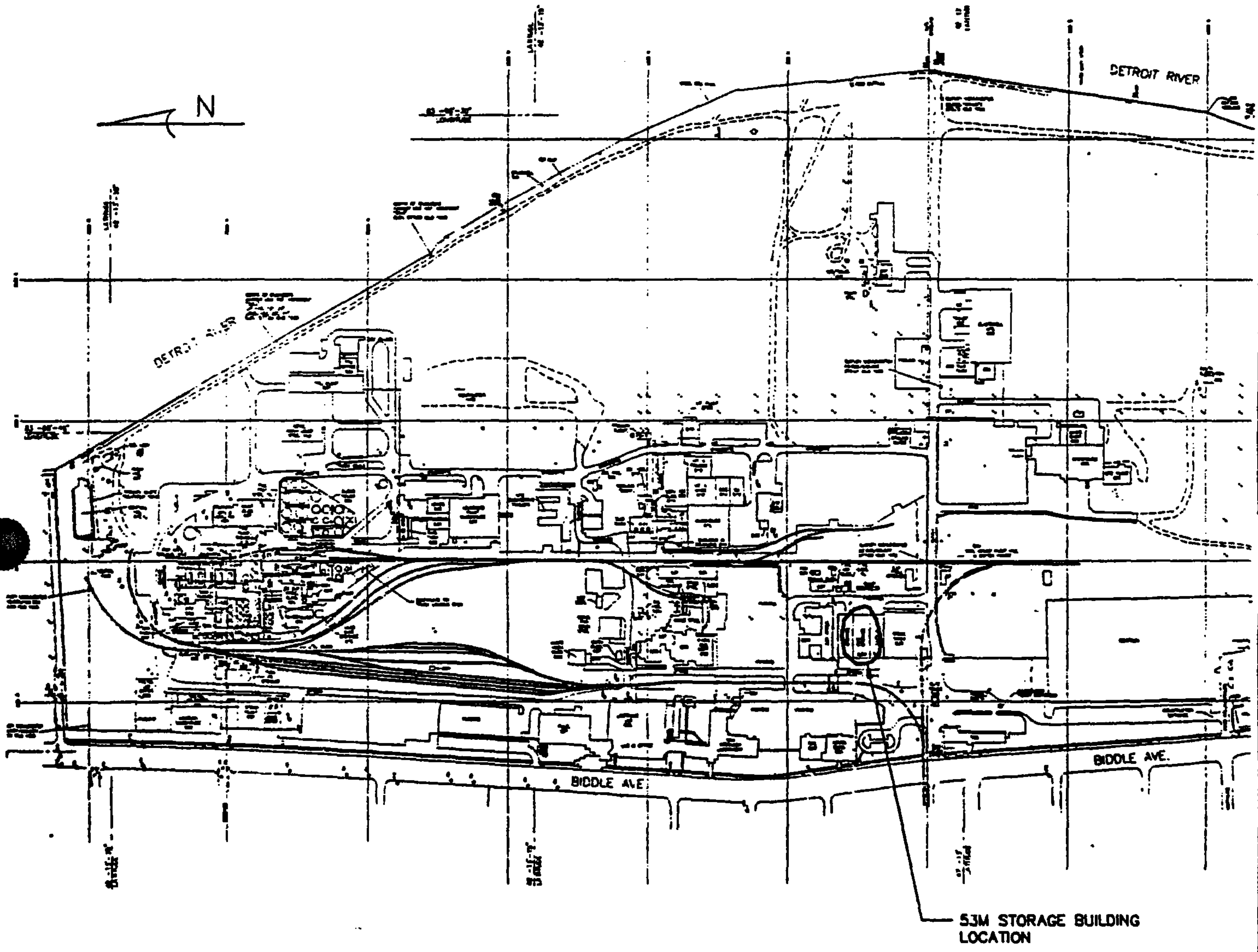
Figure 2–1

Site Location Map

BASF Corporation

1609 Biddle Avenue, Wyandotte, MI 48192

TPN: 00344–01K
Date: 8–2–93
Rev.
Drn: 060
Ref:
File: 34401K–LDWG



TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170
(313) 454-1100

Figure 2-2

Site Diagram

BASF Corporation
1609 Biddle Avenue, Wyandotte, MI 48192

TPN: 00344-01K
Date: 8-2-93
Rev.
Drn: 060
Ref:
File: 34401K-3.DWG

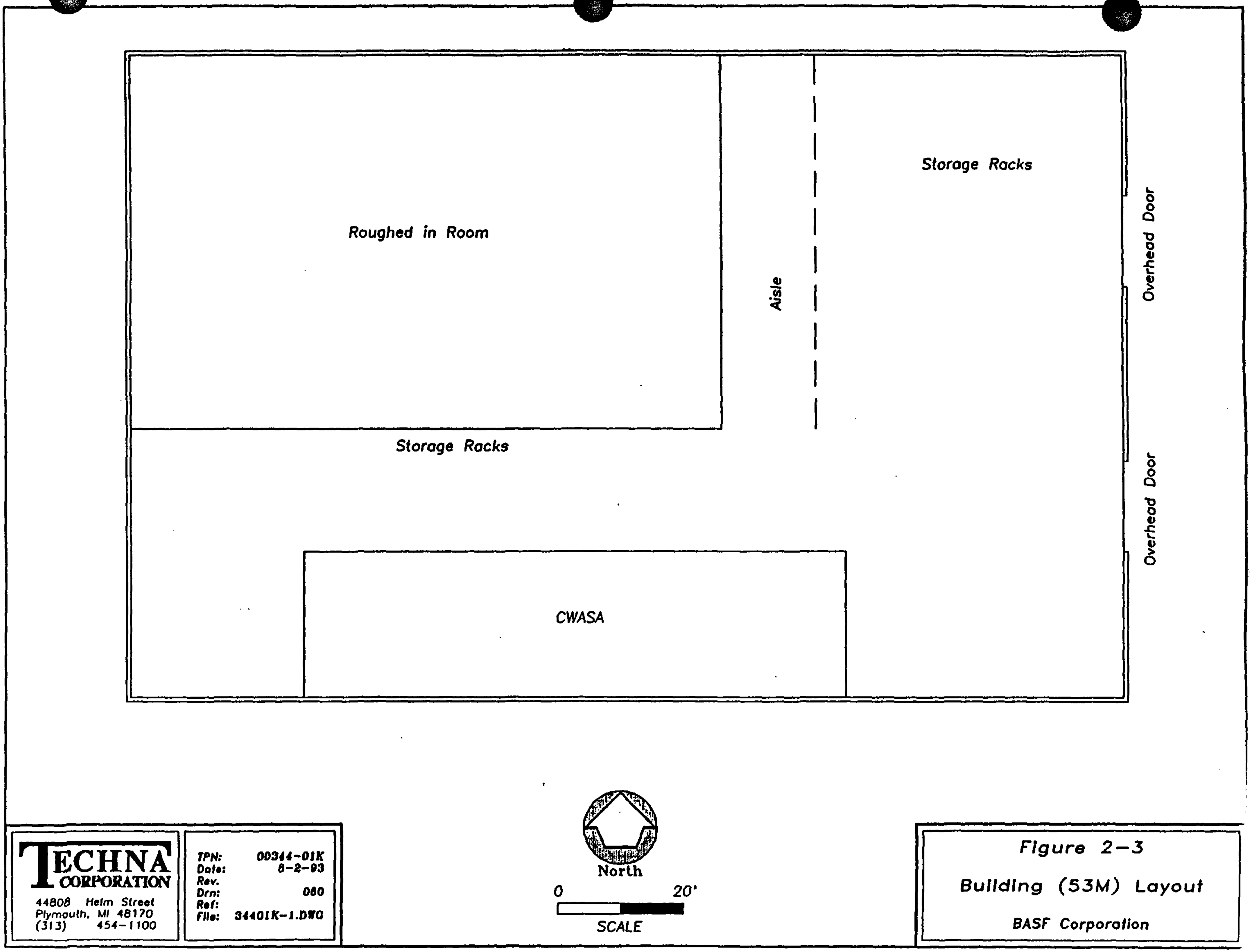
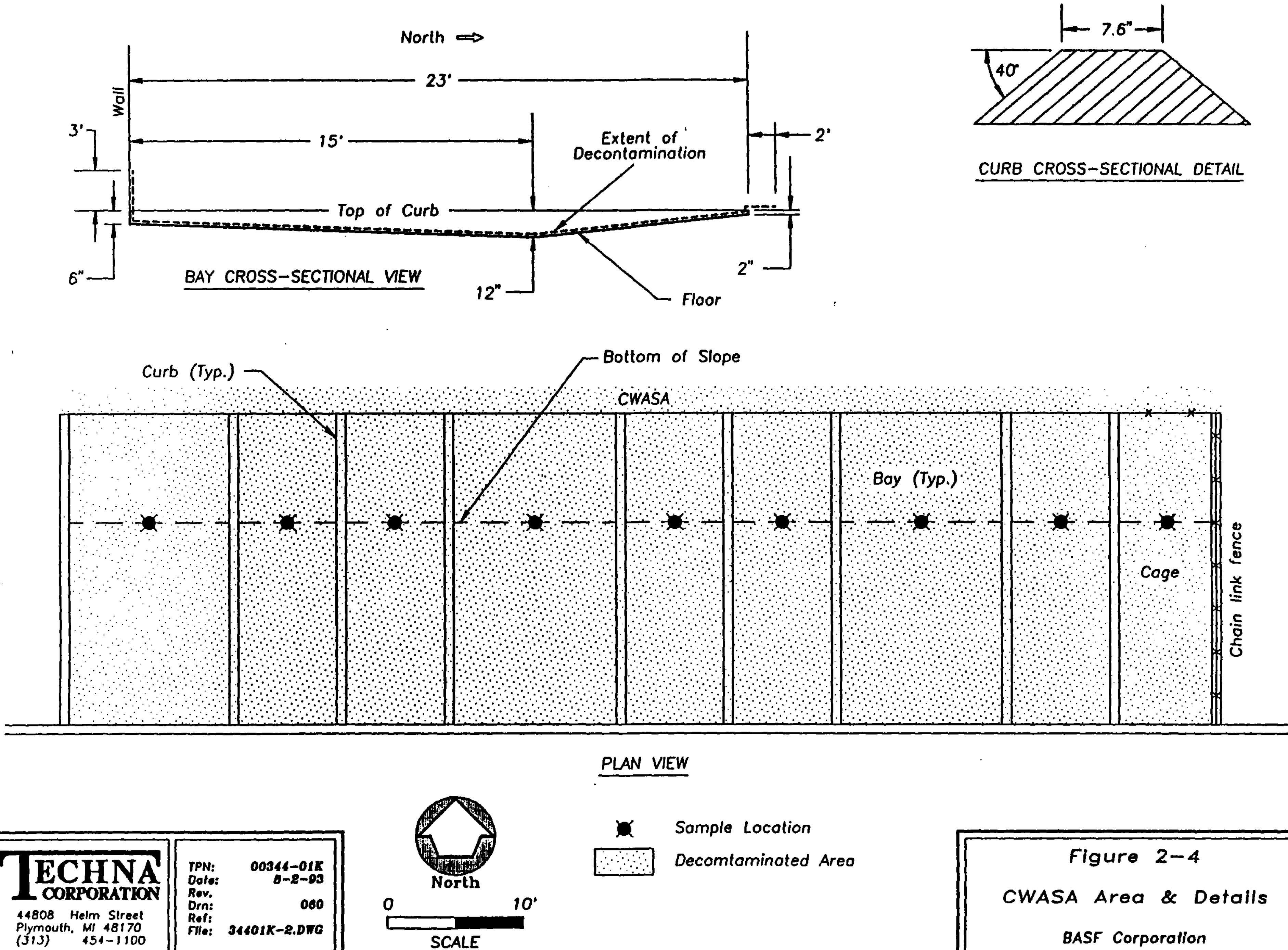


Figure 2-3

Building (53M) Layout

BASF Corporation



Sample Location

Decomtaminated Area

TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170
(313) 454-1100

TPN: 00344-01K
Date: 8-2-93
Rev.
Drn: 060
Ref:
File: 34401K-2.DWG

Figure 2-4

CWASA Area & Details

BASF Corporation

2.3 Site Geology

The site geology is reported (S.S. Papadopulos & Associates, Inc., Rate and Direction of Ground-Water Flow at the North Works BASF Wyandotte Corporation, December, 1982) to consist primarily of a 15 foot - 20 foot thick zone of fill, containing some fluvial sand, soft clay and peat, overlying glacial and post-glacial deposits, mostly lake clay. The lake clay is reported to be 40 to 70 feet thick, to have a very low hydraulic conductivity, and to form a confining layer separating water within the shallow materials from the underlying dolomite basement formation. Groundwater within the dolomite formation contains large amounts of sulfide and is unsuitable as a source of potable water.

The local stratigraphy was characterized through soil boring 49 located about 250 to 300 feet northeast of the CWASA. This boring began at an elevation of approximately 577 feet AMSL and encountered the following sequential strata beginning at the ground surface: four to five feet of surface fill material, two and a half feet of lime and cinders, two feet of gravel, two feet of blue clay, three feet of silt and lake sand, four feet of lake sand, followed by gray clay to the end of boring at an elevation of approximately 557 feet AMSL. Other borings east of the CWASA encountered similar materials; however, the thicknesses of individual strata vary considerably.

The direction of groundwater flow within the surficial materials has been described by S. S. Papadopulos & Associates. Groundwater is mostly derived from infiltration through the surface of the site, and the rate of recharge depends on the character of the surficial material. Groundwater from the CWASA area flows toward the southeast. Groundwater levels across the site fluctuate in response to seasonal variations in the recharge rates and fluctuations in river stage. These fluctuations results in seasonal variations in the local direction and magnitude of both hydraulic gradient and groundwater flow.

2.4 Waste Management History

The CWASA was used from August 1, 1983 to June 22, 1992 for accumulation of non-hazardous wastes and less than 90-day accumulation of hazardous wastes. Waste management activities at the CWASA were discontinued on July 22, 1992. All wastes were contained in sealed 55-gallon drums or smaller containers during accumulation at the CWASA. Other waste management activities, such as waste sampling, lab packing, and the preparation of waste containers for shipment (i.e. labeling and marking), also took place at the CWASA. Weekly inspection records indicate that no serious spills, leaks or other releases of hazardous wastes have occurred in the CWASA. Information contained in the facility records and Biennial Reports regarding the management of waste materials at the CWASA has provided the primary basis for evaluating the types and quantities of wastes accumulated at this facility. A summary of this data is presented in Table 2-1.

The data in Table 2-1 indicates that a variety of listed and characteristic wastes have been accumulated at the CWASA. Based on the compositions and quantities of the waste materials identified in Table 2-1, the hazardous waste constituents (40 CFR 262 Appendix VIII) that could have been released through waste management activities have been identified and are presented in Table 2-2.

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
U223	Toluene Diisocyanate	68,460 P	45,900 P		9565 G	402 G
D001	Waste Solid Isocyanate	155,490 P				
D002	Chromic Acid (D007)	83 T				
U221	Toluenediamine	61,414 P				
D002	Corrosive Solid	2,503 P				
D001	Flammable Liquid	750 P				
D001	Flammable Liquid Poison	2,000 P				
D002	Corrosive Liquid	508 P				
F002	Methylene Chloride (TDI, MDI [U223,U080])	89,440 P	40,760 P	73,200 P		
F002	Waste Resin and Solvent	158,240 P		179 T	27,205 G	
D002	Sulfuric Acid		500 P			
D002	Waste Caustic Liquids		165 G			
D002	Phenyl Phosphate		22 G			
D002	Phenyl Phosphate		19 P			
D001	Bush Vacuum System Oil (D003)		4,000 P	52,278 P	4,275 G	
D001	Lab Solvents			11700 G		
D001	Lab Pack Chemicals [D002,D003]			5260 P		
D001	Lab Waste (F003)				11,700 P	
D001	Off Specification Material (D002, D003)				5,260 P	

[1] Hazardous waste description includes additional waste codes applicable to the subject waste.

[2] G = Gallons P = Pounds KG = Kilograms T = Tons

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
U009	Styrene & Acrylonitrile				770 G	
D001	Spent Solvent from Cleaning Process Equipment				27,555 G	
D001	Ignitable Process Waste				1,220 G	4,205 G
D002	Potassium Hydroxide				55 G	110 G
D001	Off Specification Ignitable Waste (Morpholine)				165 G	55 G
D003	Off Specification MDI				2,485 G	328 G
D003	Lab Waste (Contains TDI, MDI)				890 G	320 G
F003	Lab Waste (F005, D001)				335 G	
D002	Potassium Hydroxide & Oil				55 G	
D001	Lab Waste (Acetone & Dimethylformamide)				35 G	185 G
D001	Off Specification, or Spent IPA				275 G	110 G
D003	Load-Unload Residue MDI				300 G	1,477 G
U223	Load-Unload Residue TDI				115 G	1,108 G
D001	Off Specification Diethanolamine				55 G	
D001	Off Specification Triethanolamine				55 G	
D001	Ethylene Glycol & Diethylaminoethanol				5 G	85 G
F003	Lab Waste (Pyridine, Acetone, Methanol)[F005]			725 G	275 G	
F003	Lab Waste Acetone, Toluene, Methanol (F005)				1,031 G	2,705 G
D003	Lab Waste Chlorobenzene, MDI (F002)				45 G	25 G

[1] Hazardous waste description includes additional waste codes applicable to the subject waste.

[2] G = Gallons P = Pounds KG = Kilograms T = Tons

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
F003	Spent Acetone				2,985 G	2,105 G
F003	Spent Solvent (F005, D001)				4,240 G	
U220	Off Specification, Contains Toluene				55 G	
D001	Off Specification Cyclohexane				55 G	
D002	Lab Waste				240 G	17 G
F002	Spent Mixed Solvent (F003, F005)				325 G	775 G
U028	Diethylhexylphalate				1,525 G	
D001	Diemthylformamide				4,825 G	26,799 G
D001	Off Specification Toluene, Methanol				34,792 G	34,317 G
F003	Off Specification Mixed Solvents (F005)				34,792 G	
D007	Process Waste				11,135 G	3,300 G
D001	Process Waste				440 G	
D001	Process Waste (D002)				1,255 G	1,540 G
D001	Off Specification Ethanol				60 G	60 G
F005	Carbon From WW Treatment					21,367 P
F002	Spent Halogenated Solvent					22,150 G
F002	Waste Resin and Solvent					2,110 G
U009	Styrene & Acrylonitrile					175 G
D001	Air Pollution Control Waste					8,030 G

[1] **Hazardous waste description includes additional waste codes applicable to the subject waste.**

[2] **G = Gallons P = Pounds KG = Kilograms T = Tons**

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
U147	Maleic Anhydride					165 G
D002	Off Specification Tributylamine					120 G
D001	Spent Solvent					55 G
D001	Process Waste Contains Styrene & Acrylonitrile					275 G
U080	Off Specification Methylene Chloride					5 G
F003	Spent Lab Solvent (F005)					770 G
D001	Off Specification Triethylamine					15 G
D002	Off Specification Monoethylamine					575 G
D002	Off Specification Ethylhexanoic Acid					295 G
D001	Off Specification Material (Contains Ethylenediamine)[D002]					115 G
D001	Off Specification Mineral Spirits					165 G
U223	Spill Clean-up Residue					1,320 G
U007	Off Specification Acrylamide					113 G
D001	Spilled Gasoline (D018)					100 G
D001	Off Specification Diesel Fuel					125 G
F002	Spent Halogenated Solvent					165 G
U223	Lab Waste TDI & MDI (D003)					250 G
D001	Mixed Lab Solvents (F003)					646 G
D001	Off Specification Cyclohexane (D002)					58,440 P

[1] Hazardous waste description includes additional waste codes applicable to the subject waste.

[2] G = Gallons P = Pounds KG = Kilograms T = Tons

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
D001	Spent Solvent (D008)					1,600 G
D001	Gasoline from Fuel Testing (D018)					1,350 G
F002	Spent Solvent Mixture (D001, D039)					110 G
U028	Process Waste					180 G
D001	Cleaning Solvent Dimethylformamide					5,395 G
D001	Off Specification Allyl Glycidyl Ether					5 G
D018	Off Specification Benzene & Tertiary Amines					5 G
D001	Process Waste (Contains Polysiloxane)					55 G
D001	Mixed Lab Solvents (F003, F005, D011)					50 G
D001	Spent Solvents Toluene & Methanol					6,490 G
U154	Air Pollution Control Waste (U220)					110 G
U223	Spill Clean-up Residue					450 P
D002	Off Specification Hydrochloric Acid					55 G
U009	Styrene & Acrylonitrile Contaminated Piping					770 G
D001	Oil Contaminated Paper					1,430 G
D001	Mixed Lab Solvents (D010, D022, D038)					1,815 G
U001	Off Specification Acetalaldehyde					275 G
D001	Process Waste (D002, D006, D007)					250 G
D002	Lab Waste Sulfuric Acid					1,582 G

[1] Hazardous waste description includes additional waste codes applicable to the subject waste.

[2] G = Gallons P = Pounds KG = Kilograms T = Tons

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
F002	Mixed Lab Solvent (F003), Phenol, Dichlorobenzene, Acetone					150 G
D002	Corrosive Lab Waste (D007)					126 G
P022	Carbon Disulfide					1 P
P106	Sodium Cyanide					2 P
P018	Brucine					1 P
P039	Off Specification Product					0.5 P
P005	Allyl Alcohol					4.2 P
N/A	PCBs			15 KG	675 KG	

[1] **Hazardous waste description includes additional waste codes applicable to the subject waste.**

[2] **G = Gallons P = Pounds KG = Kilograms T = Tons**

TABLE 2-2

HAZARDOUS CONSTITUENT SUMMARY AND CHEMICAL ANALYSIS STRATEGY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	HAZARDOUS WASTE CONSTITUENT	CONSTITUENT ANALYSIS GROUP
D001	Waste Solvent - Hydrocarbon	Volatile Aromatic Hydrocarbons	VOA - Aromatic
D007	Chromic Acid	Chromium	RCRA Metal
D002	Corrosive Solid	Not Applicable	N/A
D002	Corrosive Liquid	Not Applicable	N/A
D007	Process Waste	Cadmium	RCRA Metal
U147	Maleic Anhydride	Maleic Acid	*
U223	Toluene Diisocyanate	Toluene Diisocyanate	*
U221	Toluenediamine	Toluenediamine	BNA
F002	Spent Halogenated Solvents	Tetrachloroethylene	VOA-Chlorinated
		Methylene Chloride	VOA-Chlorinated
		Trichloroethylene	VOA-Chlorinated
		1,1,1-Trichloroethene	VOA-Chlorinated
		Chlorobenzene	VOA-Chlorinated
		1,1,2-Trichloro-1,2,2-trifluoroethane	VOA-Chlorinated
		ortho-Dichlorobenzene	VOA-Chlorinated
		Trichlorofluoromethane	VOA-Chlorinated
		1,1,2-Trichloroethane	VOA-Chlorinated
U007	Acrylamide	Acrylamide	*
U009	Acrylonitrile	Acrylonitrile	VOA-Nitrile

*No SW-846 analysis group has been identified for this constituent

TABLE 2-2

HAZARDOUS CONSTITUENT SUMMARY AND CHEMICAL ANALYSIS STRATEGY (CONT'D)

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	HAZARDOUS WASTE CONSTITUENT	CONSTITUENT ANALYSIS GROUP
F003	Non-Halogenated Solvent	Xylene	VOA - Aromatic
		Acetone	VOA-Ketone
		Ethyl Acetate	*
		Ethylbenzene	VOA - Aromatic
		Ethyl Ether	*
		Methyl Isobutyl Ketone	VOA-Ketone
		n-Butyl Alcohol	*
		Cyclohexanone	*
D003	Methylene Bisphenyl Isocyanate	Not Applicable	N/A
F005	Non-Halogenated Solvent	Toluene	VOA - Aromatic
	Methyl Ethyl		KetoneVOA
		Carbon Disulfide	VOA
		Isobutanol	*
		Pyridine	BNA
		Benzene	VOA - Aromatic
		2-Ethoxyethanol	*
		2-Nitropropane	*
U028	Diethylhexylphthalate	Diethylhexylphthalate	BNA
U080	Methylene Chloride	Methylene Chloride	VOA-Chlorinated
D001	Waste Fuel	Benzene	VOA - Aromatic
		Xylene	VOA - Aromatic
		Ethylbenzene	VOA - Aromatic
		Toluene	VOA - Aromatic
D011	Mixed Lab Solvents	Silver	RCRA Metal

*No SW-846 analysis group has been identified for this contituent

TABLE 2-2

HAZARDOUS CONSTITUENT SUMMARY AND CHEMICAL ANALYSIS STRATEGY (CONT'D)

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	HAZARDOUS WASTE CONSTITUENT	CONSTITUENT ANALYSIS GROUP
D001	Mixed Lab Solvents	Selenium Chloroform Pyridine	RCRA Metal VOA-Chlorinated BNA
U154	Methanol	Methanol	*
D018	Benzene	Benzene	VOA - Aromatic
F002	Mixed Lab Solvent	Phenol Dichlorobenzene Acetone	BNA BNA VOA-Ketone
U220	Off Specification Material	Toluene	VOA - Aromatic
D001	Process Waste	Styrene	VOA
P022	Carbon Disulfide	Carbon Disulfide	VOA
P106	Sodium Cyanide	Cyanide	Cyanide
P018	Brucine	Strychnidin-10-one, 2,3-dimethoxy	*
P039	Disulfoton	Phosphoridithioic acid, O,O-diethyl S-[2-(ethylthio) ethyl] ester	*
P005	Allyl Alcohol	2-Propen-1-ol	*
N/A	PCB	PCB	PCB

*No SW-846 analysis group has been identified for this constituent

3.0 TECHNICAL APPROACH FOR CLOSURE

3.1 Closure Schedule

Closure activities at the CWASA were conducted according to the following schedule:

ACTIVITY	DATE PERFORMED
Project Mobilization	06/01/93 - 06/09/93
Cleaning Activities	06/09/93 - 06/10/93
Chemical Analysis	06/10/93 - 06/22/93
Data Evaluation/Reporting	06/22/93 - 08/02/93
Wastewater Assessment	06/22/93 - 08/05/93
Closure Report Preparation	06/22/93 - 09/16/93

3.2 Decontamination Activities

Decontamination of the CWASA was performed by K&D Industrial Services under the supervision of Techna Corporation on June 9th and 10th, 1993. Initial decontamination activities included sweeping and the removal of loose solid debris from the CWASA. All solid materials were managed as described in Section 3.3.

All surfaces within the CWASA, the southern wall to three foot above the floor, and the floor surface, two feet directly north of the CWASA were cleaned with the heated decontamination solution using a water blaster operating at approximately 3000 psi (See Figure 2-4 For Decontamination Area). A 3.5% solution of water and All-Chem Corporation 502-GX non-butyl alkaline degreaser (See Appendix E for MSDS) was used as a decontamination solution. All water used for cleaning and rinsing activities was obtained from an on-site city water supply. Water was heated with an on site steam source. The water and steam mixture fluctuated in temperature between 120° and 130°F. The entire floor surface of the decontamination area was re-cleaned using the heated decontamination solution and a spin blaster operating at 5000 psi. The cleaning of the CWASA was concluded with a final heated wash of all decontamination areas using a water blaster operating at approximately 7000 psi. All cleaning solutions were collected and managed as described in Section 3.3.

The rinsing of the decontamination area consisted of three separate cold tap water rinses at pressures ranging from 4000 to 8000 psi. The initial rinse was conducted using the spin blaster operating at approximately 6000 psi. The second rinse was conducted using a water blaster operating at 8000 psi. All rinsates were then removed from the decontamination area prior to commencing with the third and final rinse. All solid debris dislodged during the cleaning and rinsing activities was collected and managed as described in Section 3.3. The final rinse of the decontamination area was conducted using a water blaster operating at 4000 psi. Rinsates from the final rinse were allowed to accumulate in the deepest portions of each trench prior to the sampling activities described in Section 4.0.

3.3 Management of Decontamination Rinsates and Solid Debris

A total of 2,700 gallons of combined cleaning and rinsing solutions were collected using a vacuum tanker. During the cleaning process the wastewater from the wash and first two rinses were periodically removed from the CWASA. All liquids were removed from the CWASA prior to the third and final rinse. Water generated from the third rinse was allowed to accumulate in the deepest portions of the CWASA where the rinsates were sampled consistent with the Sampling and Analysis Procedures presented in Section 4.0. After the completion of sampling activities, all liquids were removed from the CWASA. To achieve wastewater discharge authorization the combined cleaning solutions and rinsates were sampled by BASF personnel and chemically analyzed consistent with the requirements of the Wayne County Department of Public Works (WCDPW). Chemical analysis of the combined rinsates met the WCDPW acceptance criteria and were discharged to the treatment works on August 5, 1993 (See Appendix C for the chemical analysis, and permits relating to the acceptance of the wastewater by the WCDPW).

Dirt, rubbish, and cementitious material dislodged during the cleaning and rinsing of the CWASA were collected, characterized, and disposed in a manner consistent with all applicable state and federal regulatory requirements.

4.0 SAMPLING AND ANALYSIS PROCEDURES

The effectiveness of decontamination activities was evaluated by chemical analysis of a representative sample of the final rinsate. A total of nine discrete samples, one from each bay, were collected, and composited into a single sample for chemical analysis (see sample locations in Figure 2-4).

Sample containers were provided by A&B Laboratories, Farmington Hills, Michigan contracted by BASF Corporation. Samples for metals analyses were collected in plastic bottles and preserved with nitric acid. Samples for volatile organics analyses were collected in sealed glass 40-ml VOA sample containers fitted with Teflon-lined septa and preserved with 1:1 aqueous hydrochloric acid. Samples for analysis of extractable organics were collected in 1-liter pre-cleaned, amber glass containers fitted with Teflon-lined lids. All samples for organic analysis were stored at 4°C prior to analysis. Final rinsate samples were collected by Techna Corporation personnel, preserved, and managed according to standard USEPA SW-846 protocols. Custody of the final rinsate samples was relinquished by Techna Corporation to Mr. Adam Bickel of BASF Corporation at 16:05 on June 10, 1993. Final rinsate samples were relinquished to A&B Laboratories on June 11, 1993 at 11:35. All chain of custody documentation is attached in Appendix B.

Final rinsate samples were chemically analyzed for the hazardous waste constituents identified in Table 2-2. Due to the absence of a USEPA analytical method toluene diisocyanate (TDI) in water, and the fact that this compound is not likely to be present in the matrix, TDI was deleted from the proposed target analyte list. The final list of analytes, applicable SW-846 analysis methods, and Practical Quantitation Limits (PQLs) achieved by the testing laboratory are summarized in Table 4-1.

TABLE 4-1

SUMMARY OF ANALYTES, ANALYSIS METHODS AND METHOD REPORTING LIMITS

ANALYTE	SW-846 METHOD	WATER PRACTICAL QUANTITATION LIMIT (PQL) (μg/l)
Organics		
Volatiles (chlorinated, aromatic, nitrile)	8240	1.0 - 10.0 ea
Volatiles (ketones, carbon disulfide)	8240	1.0 - 10.0 ea
Base-Neutral Extractables	8270	3.0 ea
Acid Extractables	8270	3.0 ea
PCBs	608	10.0 ea
Metals, Inorganics & Others		
Cadmium	6010	3.0
Chromium	6010	7.0
Selenium	6010	7.5
Silver	6010	7.0
Cyanide	335.2	20.0

5.0 ANALYTICAL RESULTS

Chemical analyses of the final rinsate sample were performed by A&B Laboratories, Farmington Hills, Michigan. Results for analytes detected at concentrations above their respective PQL are summarized Table 5-1. The complete analytical report is presented in Appendix B.

Total metals analyses indicated that the concentrations of target analytes silver and selenium were less than the PQLs. Chromium and cadmium were detected at concentrations of 0.021 mg/l, and 0.004 mg/l respectively. Volatile organics analyses indicated elevated levels of bromodichloromethane and chloroform. No other volatile organic analytes were detected at concentrations above their respective PQL. No target analytes in the BNA group except, bis(2-ethylhexyl) phthalate (DEHP), were detected at concentrations above the PQL. DEHP was detected at 72 μg/l. No polychlorinated biphenyls were detected above the PQL in the final rinsate sample.

TABLE 5-1

SUMMARY OF CHEMICAL ANALYSIS
FINAL RINSATE

ANALYTE	RESULT	PQL	METHOD	UNITS
Bromodichloromethane	2	1	8240	μg/l
Chloroform	7.6	1	8240	μg/l
bis(2-Ethylhexyl)phthalate (DEHP)	72	10	8270	μg/l
Total Cadmium	.004	.003	6010	mg/l
Total Chromium	.021	.007	6010	mg/l

6.0 SUMMARY AND CONCLUSIONS

Cadmium and chromium were detected at 0.004 mg/l (4 μg/l) and 0.021 mg/l (21 μg/l) respectively in the final rinsate sample. A comparison of Type B health based groundwater remedial criteria and test results for cadmium and chromium are presented in Table 6-1.

TABLE 6-1

SAMPLE/ANALYTE	CADMIUM	CHROMIUM
Final Rinsate Results (μg/l)	4	21
* Act 307 Type B Groundwater Clean-up Criteria (μg/l)	3.5	120

* "MERA Operational Memorandum #8 Revision 2, July 16, 1993"

The concentration of chromium detected in the final rinsate sample is below the Type B health based remedial criterion for chromium in groundwater. The concentration of cadmium reported in the final rinsate sample exceeds the Act 307 Type B groundwater remedial criteria by 0.5 μg/l. Follow-up conversations with A&B Laboratories indicated that the reported concentration of cadmium (0.004 mg/l) was rounded up from a theoretical concentration of 3.7 μg/l. The reported concentration of cadmium is within standard rounding error, and analytical variability when compared to the Type B remedial criteria. A review of the CWASA weekly inspection logs did not indicate any spill or discharge of cadmium containing waste materials during the operation life of the CWASA. The non-waste sources which may have contributed to the analytical results include; the type of cement aggregate used in floor construction, the cleaning and rinsing water, and tire residue from fork truck traffic. Due to historical data, chemical analysis, and the similitude of the cadmium results compared to the Type B health based criteria, the concentration of cadmium detected in the final rinsewater is not considered to be indicative of any residual contamination.

The volatile organic compounds detected in the final rinsate sample are classified as trihalomethanes. These species are common contaminants in chlorinated, municipal water supplies. Their presence in the source water used for the CWASA decontamination was confirmed through chemical analysis of the BASF Corporation city water supply conducted prior to the initiation of closure activities. Bromodichloromethane and chloroform were detected in the final rinsate at concentrations similar to those found in the BASF water supply. A BASF interoffice memorandum summarizing the source water analysis, and BASF's position regarding this analysis are presented in Appendix D. The elevated levels of bromodichloromethane and chloroform detected in the final rinsewater are being attributed to the source water, and not any hazardous waste management activity.

DEHP was the only extractable organic specie detected above the PQL in the final rinsewater at a concentration of 72 $\mu g/l$. DEHP is a common plasticizer and a common analytical contaminant. Non-waste sources of DEHP include the chemically resistant floor coating (which was removed from the CWASA during closure activities), plastic materials and equipment used during the cleaning, sampling and analysis activities. DEHP (BASF Waste Code W125) was accumulated at the CWASA between 1988 and 1992. The total amount of waste DEHP accumulated during the life of the CWASA was totaled at 46x55 gallon drums. A review of the CWASA weekly inspection logs over the time period in question did not indicate any spill or release of this material during accumulation at the CWASA. It is BASF's position, based on available data, that the DEHP detected in the final rinsewater sample, while in excess of the Type B health based groundwater remedial criteria (2.5 $\mu g/l$), is not the result of any waste management activity. A correspondence detailing BASF Corporation's contention is presented in Appendix D. No further investigation is warranted.

Section 3.5 of the Hazardous Waste Accumulation Area Closure Plan, (Appendix A) states that any target chemical species detected at concentrations above the specified detection limit would be assumed to be indicative of residual contamination. Due to information obtained during closure activities, chemical analysis, historical records, and the conservative application of health based remedial criteria, this assumption can no longer be considered appropriate. All chemical anlaytes detected in the final rinsewater sample above the PQL are considered to be the result of non-waste management activities and do not pose a threat to human health or the environment.

This report constitutes documentation of clean closure of the CWASA located at 1609 Biddle Avenue, Wyandotte, Michigan as required under 40 CFR 262.34 and Rule 299.9306 of Michigan Public Act 64 of 1979.

HAZARDOUS WASTE ACCUMULATION AREA

CLOSURE PLAN

Prepared for:

BASF Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192
MID 064 197 742

May 13, 1993
Revision 1

Techna Project Number 00276–01A

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HAZARDOUS WASTE ACCUMULATION AREA CLOSURE PLAN

BASF Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192
MID 064 197 742

1.0 INTRODUCTION

BASF Corporation has developed this plan for clean closure of its Central Waste Accumulation Storage Area (CWASA). The CWASA's intended use was for the accumulation of drums and smaller containers of hazardous wastes for less than 90 days prior to transportation for off-site disposal. Hazardous wastes accumulated in this area have included a variety of materials from industrial processes, laboratory activities, research and development activities, and incidental spill clean-ups. This accumulation area was operated from August 1, 1983 until the discontinuation of activities on June 22, 1992.

BASF Corporation discontinued operation of the CWASA in 1992 and relocated all less than 90-day accumulation activities to an upgraded on-site facility, referred to in this plan as the new CWASA. The objective of this closure plan is to effect clean closure of the old CWASA. The CWASA will be used for general warehousing and non-waste management related activities after clean closure. Closure of the CWASA is required under 40 CFR 262.34 and Rule 299.9306 of Michigan Act 64 of 1979. All closure activities will be conducted in compliance with the Closure Performance Standards of 40 CFR 265.111.

Since hazardous waste management in CWASA was conducted within a totally enclosed structure, the closure program only needs to consist of facility decontamination and verification activities and does not need to include sampling and analysis of proximate soils and/or groundwater to evaluate potential impacts of hazardous waste management activities. Closure activities will initially consist of an extensive cleaning of the surfaces of the accumulation area that reasonably could have been impacted by hazardous waste management activities. The success of decontamination will be evaluated through chemical analyses of a final clean water rinse of all affected surfaces to determine if residual contamination is indicated. If residual contamination is identified, additional decontamination activities will be conducted as necessary. If decontamination cannot successfully remove all target constituents, further investigation will be conducted to determine the most cost effective method for remediating the affected area(s).

2.0 SITE DESCRIPTION AND HISTORY

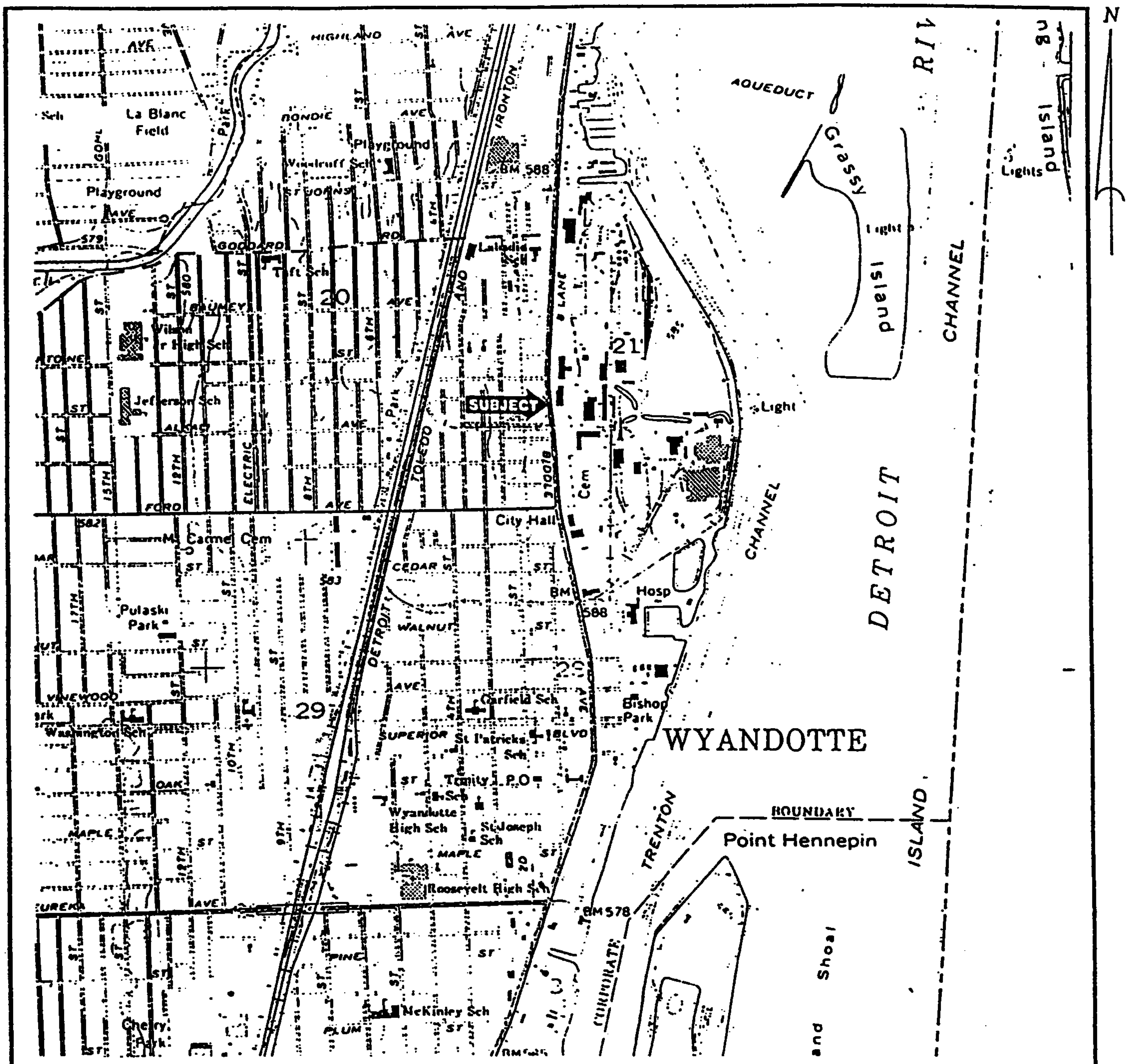
2.1 Facility Location

BASF Corporation is located in southeastern Wayne County at 1609 Biddle Avenue, Wyandotte, Michigan (see Figure 2-1). The CWASA is located in the west-central portion of the subject site inside building 53-M (see Figure 2-2). The plant contact for all inquiries concerning the accumulation area closure program is Mr. Adam Bickel (313-246-6836).

2.2 Facility Construction and Usage

The CWASA occupies approximately 2,000 square feet of floor space in an approximately 16,000 square foot building (Figure 2-3). The remaining portions of the structure have been used for general warehousing and other non-waste activities. The building, identified as building 53-M, is thought to have been completed in the early 1890s and is constructed with masonry (concrete and brick) walls, and a continuous concrete slab floor. All waste management activities were conducted on impermeable surfaces within the totally enclosed facility. The maximum capacity of the CWASA was limited to 450 drums.

The CWASA is divided into nine bays by poured concrete partitions (Figure 2-4). The partitions range in height from two inches at the shallowest, northern portion of the CWASA to 12 inches at the deepest, central portion of each bay. Prior to the initiation of waste accumulation activities, the existing floor of the CWASA was scarified and mortared with a low permeability cementitious grout. The floor of the CWASA was subsequently sealed with a chemically resistant polyurethane coating. Application of the floor coating was repeated periodically throughout the operating life of the CWASA.



SCALE 1:24000

1 | 0 | 1 MILE

1000 | 0 | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 | 7000 FEET

1 | .5 | 0 | 1 KILOMETER

Source: USGS

Wyandotte, MI–ONT.
7.5 Minute Quadrangle (Photorevised 1981)

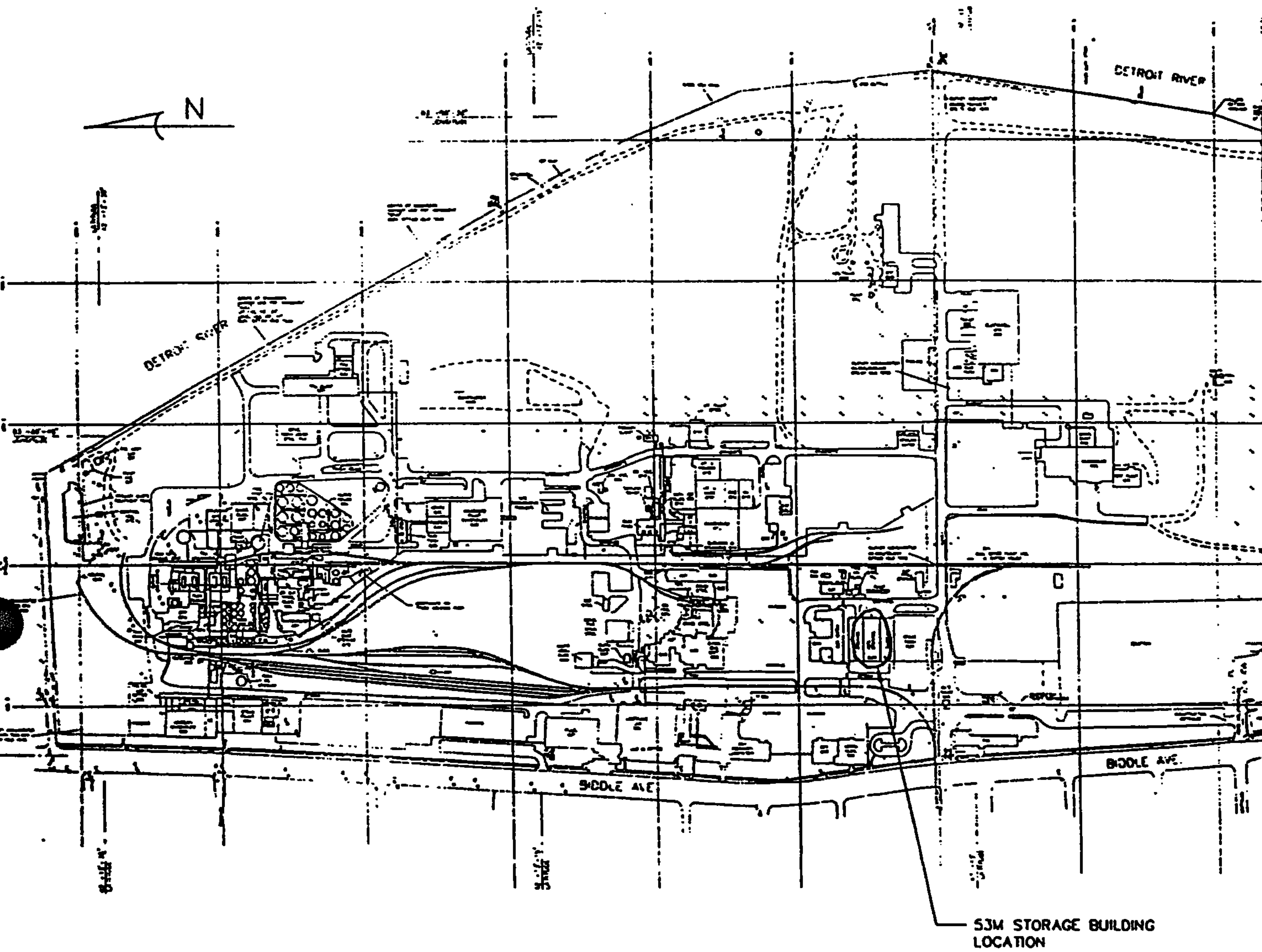
TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170
(313) 454-1100

Figure 2–1

Site Location Map

BASF Corporation
1609 Biddle Avenue, Wyandotte, MI 48192

TPN: 00276-01A
Date: 2-25-93
Rev.
Drn: 060
Ref:
File: 27601A-L.DWG



TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170
(313) 454-1100

Figure 2-2

Site Diagram

BASF Corporation
1609 Biddle Avenue, Wyandotte, MI 48192

TPN: 00276-01A
Date: 2-25-93
Rev.
Drn: 000
Ref:
File: 27601A-3.DWG

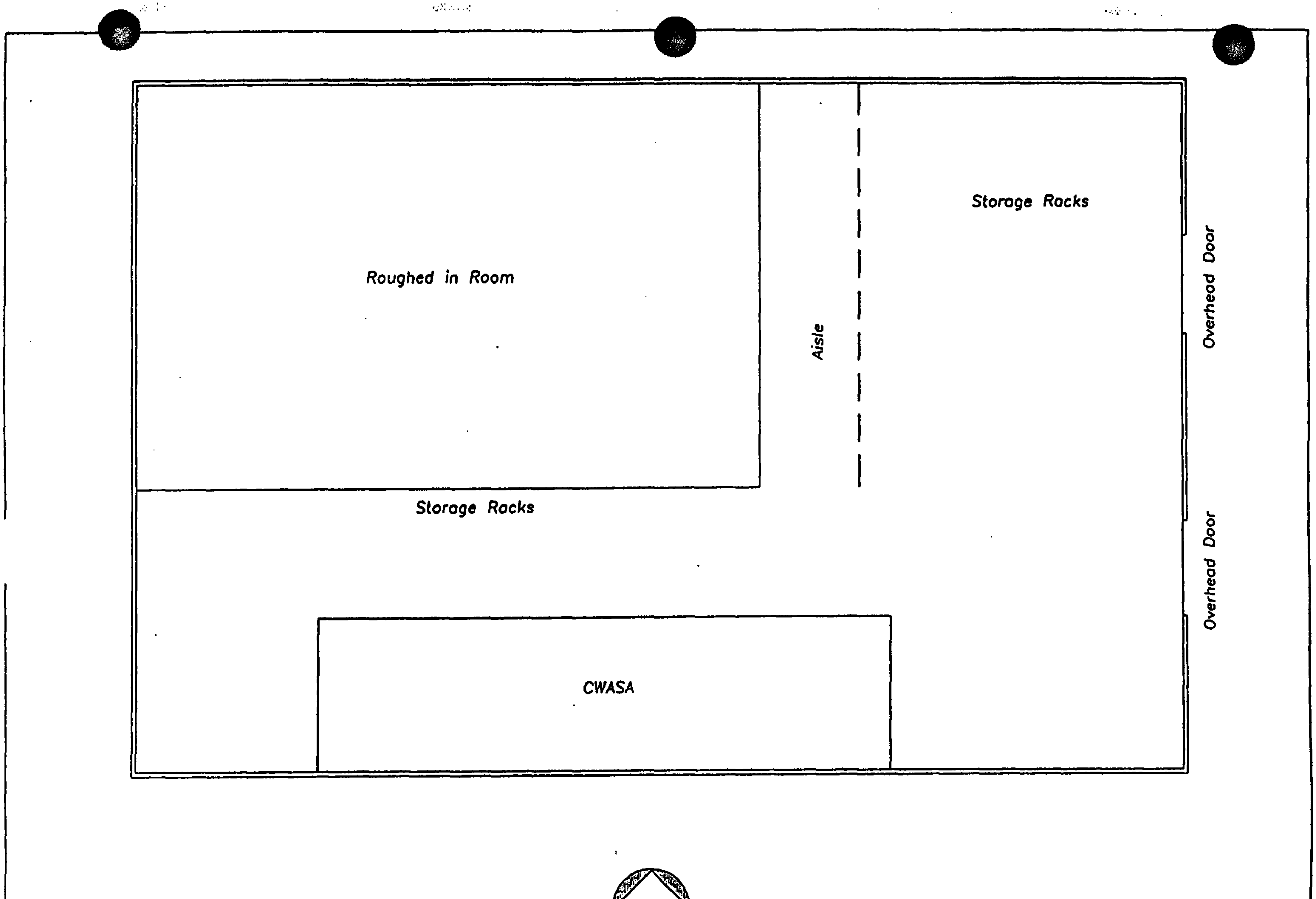
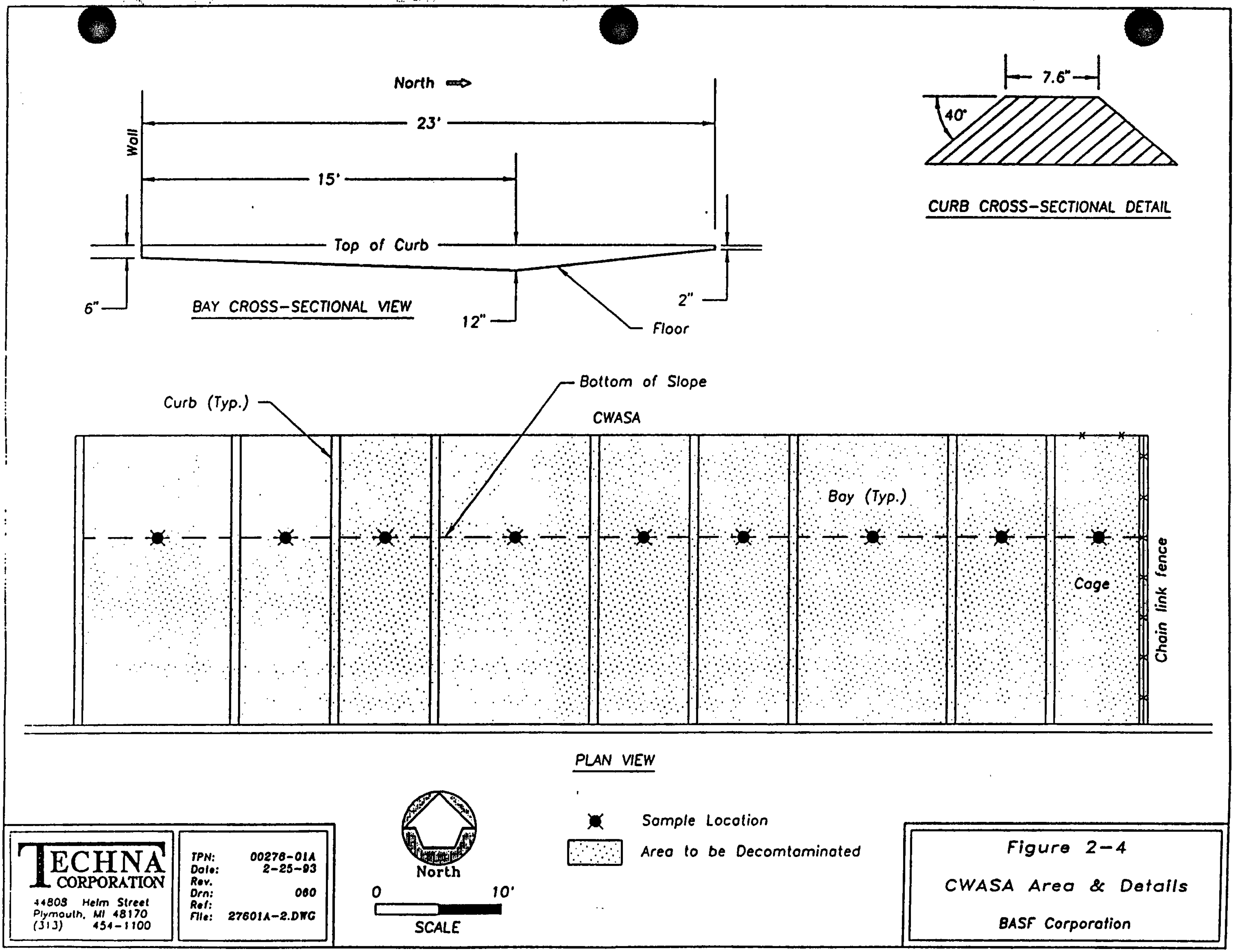


Figure 2-3
Building (53M) Layout
BASF Corporation


North
23'
Wall
15'
Top of Curb
6"
BAY CROSS-SECTIONAL VIEW
12"
2"
Floor
7.6"
40°
CURB CROSS-SECTIONAL DETAIL
Bottom of Slope
Curb (Typ.)
CWASA
Bay (Typ.)
Cage
Chain link fence
PLAN VIEW
North
0
10'
SCALE
Sample Location
Area to be Decomtaminated
TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170
(313) 454-1100
TPN: 00276-01A
Date: 2-25-93
Rev.
Drn: 060
Ref:
File: 27601A-2.DWG
Figure 2-4
CWASA Area & Details
BASF Corporation

2.3 Site Geology

The site geology is reported (S.S. Papadopulos & Associates, Inc., Rate and Direction of Ground-Water Flow at the North Works BASF Wyandotte Corporation, December, 1982) to consist primarily of a 15 foot - 20 foot thick zone of fill, with some fluvial sand, soft clay and peat, overlying glacial and post-glacial deposits, mostly lake clay. The lake clay is reported to be 40 to 70 feet thick, to have a very low hydraulic conductivity, and to form a confining layer separating water within the shallow materials from the underlying dolomite basement formation. Groundwater within the dolomite formation contains large amounts of sulfide and is unsuitable as a source of potable water.

The local stratigraphy was characterized through soil boring 49, (see appendix), located about 250 to 300 feet northeast of the CWASA. This boring began at an elevation of approximately 577 feet AMSL and encountered the following sequential strata beginning at the ground surface: four to five feet of surface fill material, two and a half feet of lime and cinders, two feet of gravel, two feet of blue clay, three feet of silt and lake sand, four feet of lake sand, followed by gray clay to the end of boring at an elevation of approximately 557 feet AMSL. Other borings east of the CWASA encountered similar materials; however, the thicknesses of individual strata vary considerably.

The direction of groundwater flow within the surficial materials has been described by S. S. Papadopulos & Associates. Groundwater is mostly derived from infiltration through the surface of the site, and the rate of recharge depends on the character of the surficial material. Groundwater from the CWASA area flows toward the southeast. Groundwater levels across the site fluctuate in response to seasonal variations in the recharge rates and fluctuations in river stage. These fluctuations results in seasonal variations in the local direction and magnitude of both hydraulic gradient and groundwater flow.

2.4 Waste Management History

The CWASA was used from August 1, 1983 to June 22, 1992 for accumulation of non-hazardous wastes and less than 90-day accumulation of hazardous wastes. All wastes were contained in sealed 55-gallon drums or smaller containers while being accumulated at the CWASA. Other waste management activities, such as waste sampling, lab packing, and the preparation of waste containers for shipment (i.e. labeling and marking), also took place at the CWASA. Weekly inspection records indicate that no serious spills, leaks or other releases of hazardous wastes have occurred in the CWASA. Information contained in the facility records and Biennial Reports regarding the management of waste materials at the CWASA provides the primary basis for evaluating the types and quantities of wastes accumulated at this facility. A summary of this data is presented in Table 2-1.

The data in Table 2-1 indicates that a variety of listed and characteristic wastes have been accumulated at the CWASA. Based on the compositions and quantities of the waste materials identified in Table 2-1, the hazardous waste constituents (40 CFR 262 Appendix VIII) that could have been released through waste management activities have been identified and are presented in Table 2-2.

2.5 Waste Management During Closure

No waste materials are currently stored in the CWASA. All containerized waste materials formerly destined for accumulation at this area are accumulated for less than 90 days at the new CWASA.

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
U223	Toluene Diisocyanate	68,460 P	45,900 P		9565 G	402 G
D001	Waste Solid Isocyanate	155,490 P				
D002	Chromic Acid (D007)	83 T				
U221	Toluenediamine	61,414 P				
D002	Corrosive Solid	2,503 P				
D001	Flammable Liquid	750 P				
D001	Flammable Liquid Poison	2,000 P				
D002	Corrosive Liquid	508 P				
F002	Methylene Chloride (TDI, MDI [U223,U080])	89,440 P	40,760 P	73,200 P		
F002	Waste Resin and Solvent	158,240 P		179 T	27,205 G	
D002	Sulfuric Acid		500 P			
D002	Waste Caustic Liquids		165 G			
D002	Phenyl Phosphate		22 G			
D002	Phenyl Phosphate		19 P			
D001	Bush Vacuum System Oil (D003)		4,000 P	52,278 P	4,275 G	
D001	Lab Solvents			11700 G		
D001	Lab Pack Chemicals [D002,D003]			5260 P		
D001	Lab Waste (F003)				11,700 P	
D001	Off Specification Material (D002, D003)				5,260 P	

[1] Hazardous waste description includes additional waste codes applicable to the subject waste.

[2] G = Gallons P = Pounds KG = Kilograms T = Tons

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
U009	Styrene & Acrylonitrile				770 G	
D001	Spent Solvent from Cleaning Process Equipment				27,555 G	
D001	Ignitable Process Waste				1,220 G	4,205 G
D002	Potassium Hydroxide				55 G	110 G
D001	Off Specification Ignitable Waste (Morpholine)				165 G	55 G
D003	Off Specification MDI				2,485 G	328 G
D003	Lab Waste (Contains TDI, MDI)				890 G	320 G
F003	Lab Waste (F005, D001)				335 G	
D002	Potassium Hydroxide & Oil				55 G	
D001	Lab Waste (Acetone & Dimethylformamide)				35 G	185 G
D001	Off Specification, or Spent IPA				275 G	110 G
D003	Load-Unload Residue MDI				300 G	1,477 G
U223	Load-Unload Residue TDI				115 G	1,108 G
D001	Off Specification Diethanolamine				55 G	
D001	Off Specification Triethanolamine				55 G	
D001	Ethylene Glycol & Diethylaminoethanol				5 G	85 G
F003	Lab Waste (Pyridine, Acetone, Methanol)[F005]			725 G	275 G	
F003	Lab Waste Acetone, Toluene, Methanol (F005)				1,031 G	2,705 G
D003	Lab Waste Chlorobenzene, MDI (F002)				45 G	25 G

[1] **Hazardous waste description includes additional waste codes applicable to the subject waste.**

[2] **G = Gallons P = Pounds KG = Kilograms T = Tons**

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
F003	Spent Acetone				2,985 G	2,105 G
F003	Spent Solvent (F005, D001)				4,240 G	
U220	Off Specification, Contains Toluene				55 G	
D001	Off Specification Cyclohexane				55 G	
D002	Lab Waste				240 G	17 G
F002	Spent Mixed Solvent (F003, F005)				325 G	775 G
U028	Diethylhexylphalate				1,525 G	
D001	Diemthylformamide				4,825 G	26,799 G
D001	Off Specification Toluene, Methanol				34,792 G	34,317 G
F003	Off Specification Mixed Solvents (F005)				34,792 G	
D007	Process Waste				11,135 G	3,300 G
D001	Process Waste				440 G	
D001	Process Waste (D002)				1,255 G	1,540 G
D001	Off Specification Ethanol				60 G	60 G
F005	Carbon From WW Treatment					21,367 P
F002	Spent Halogenated Solvent					22,150 G
F002	Waste Resin and Solvent					2,110 G
U009	Styrene & Acrylonitrile					175 G
D001	Air Pollution Control Waste					8,030 G

[1] **Hazardous waste description includes additional waste codes applicable to the subject waste.**

[2] **G = Gallons P = Pounds KG = Kilograms T = Tons**

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
U147	Maleic Anhydride					165 G
D002	Off Specification Tributylamine					120 G
D001	Spent Solvent					55 G
D001	Process Waste Contains Styrene & Acrylonitrile					275 G
U080	Off Specification Methylene Chloride					5 G
F003	Spent Lab Solvent (F005)					770 G
D001	Off Specification Triethylamine					15 G
D002	Off Specification Monoethylamine					575 G
D002	Off Specification Ethylhexanoic Acid					295 G
D001	Off Specification Material (Contains Ethylenediamine)[D002]					115 G
D001	Off Specification Mineral Spirits					165 G
U223	Spill Clean-up Residue					1,320 G
U007	Off Specification Acrylamide					113 G
D001	Spilled Gasoline (D018)					100 G
D001	Off Specification Diesel Fuel					125 G
F002	Spent Halogenated Solvent					165 G
U223	Lab Waste TDI & MDI (D003)					250 G
D001	Mixed Lab Solvents (F003)					646 G
D001	Off Specification Cyclohexane (D002)					58,440 P

[1] **Hazardous waste description includes additional waste codes applicable to the subject waste.**

[2] **G = Gallons P = Pounds KG = Kilograms T = Tons**

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
D001	Spent Solvent (D008)					1,600 G
D001	Gasoline from Fuel Testing (D018)					1,350 G
F002	Spent Solvent Mixture (D001, D039)					110 G
U028	Process Waste					180 G
D001	Cleaning Solvent Dimethylformamide					5,395 G
D001	Off Specification Allyl Glycidyl Ether					5 G
D018	Off Specification Benzene & Tertiary Amines					5 G
D001	Process Waste (Contains Polysiloxane)					55 G
D001	Mixed Lab Solvents (F003, F005, D011)					50 G
D001	Spent Solvents Toluene & Methanol					6,490 G
U154	Air Pollution Control Waste (U220)					110 G
U223	Spill Clean-up Residue					450 P
D002	Off Specification Hydrochloric Acid					55 G
U009	Styrene & Acrylonitrile Contaminated Piping					770 G
D001	Oil Contaminated Paper					1,430 G
D001	Mixed Lab Solvents (D010, D022, D038)					1,815 G
U001	Off Specification Acetalaldehyde					275 G
D001	Process Waste (D002, D006, D007)					250 G
D002	Lab Waste Sulfuric Acid					1,582 G

[1] **Hazardous waste description includes additional waste codes applicable to the subject waste.**

[2] **G = Gallons P = Pounds KG = Kilograms T = Tons**

TABLE 2-1

WASTE MANAGEMENT SUMMARY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION [1]	ANNUAL QUANTITIES [2]				
		1984	1985	1986-87	1988-89	1990-91
F002	Mixed Lab Solvent (F003), Phenol, Dichlorobenzene, Acetone					150 G
D002	Corrosive Lab Waste (D007)					126 G
P022	Carbon Disulfide					1 P
P106	Sodium Cyanide					2 P
P018	Brucine					1 P
P039	Off Specification Product					0.5 P
P005	Allyl Alcohol					4.2 P
N/A	PCBs			15 KG	675 KG	

[1] Hazardous waste description includes additional waste codes applicable to the subject waste.

[2] G = Gallons P = Pounds KG = Kilograms T = Tons

TABLE 2-2

HAZARDOUS CONSTITUENT SUMMARY AND
CHEMICAL ANALYSIS STRATEGY

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	HAZARDOUS WASTE CONSTITUENT	CONSTITUENT ANALYSIS GROUP
D001	Waste Solvent - Hydrocarbon	Volatile Aromatic Hydrocarbons	VOA - Aromatic
D007	Chromic Acid	Chromium	RCRA Metal
D002	Corrosive Solid	Not Applicable	N/A
D002	Corrosive Liquid	Not Applicable	N/A
D007	Process Waste	Cadmium	RCRA Metal
U147	Maleic Anhydride	Maleic Acid	*
U223	Toluene Diisocyanate	Toluene Diisocyanate	*
U221	Toluenediamine	Toluenediamine	BNA
F002	Spent Halogenated Solvents	Tetrachloroethylene	VOA-Chlorinated
		Methylene Chloride	VOA-Chlorinated
		Trichloroethylene	VOA-Chlorinated
		1,1,1-Trichloroethene	VOA-Chlorinated
		Chlorobenzene	VOA-Chlorinated
		1,1,2-Trichloro-1,2,2-trifluoroethane	VOA-Chlorinated
		ortho-Dichlorobenzene	VOA-Chlorinated
		Trichlorofluoromethane	VOA-Chlorinated
		1,1,2-Trichloroethane	VOA-Chlorinated
U007	Acrylamide	Acrylamide	*
U009	Acrylonitrile	Acrylonitrile	VOA-Nitrile

TABLE 2-2

HAZARDOUS CONSTITUENT SUMMARY AND
CHEMICAL ANALYSIS STRATEGY
(CONT'D)

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	HAZARDOUS WASTE CONSTITUENT	CONSTITUENT ANALYSIS GROUP
F003	Non-Halogenated Solvent	Xylene	VOA - Aromatic
		Acetone	VOA-Ketone
		Ethyl Acetate	*
		Ethylbenzene	VOA - Aromatic
		Ethyl Ether	*
		Methyl Isobutyl Ketone	VOA-Ketone
		n-Butyl Alcohol	*
		Cyclohexanone	*
D003	Methylene Bisphenyl Isocyanate	Not Applicable	N/A
F005	Non-Halogenated Solvent	Toluene	VOA - Aromatic
	Methyl Ethyl		KetoneVOA
		Carbon Disulfide	VOA
		Isobutanol	*
		Pyridine	BNA
		Benzene	VOA - Aromatic
		2-Ethoxyethanol	*
		2-Nitropropane	*
U028	Diethylhexylphthalate	Diethylhexylphthalate	BNA
U080	Methylene Chloride	Methylene Chloride	VOA-Chlorinated
D001	Waste Fuel	Benzene	VOA - Aromatic
		Xylene	VOA - Aromatic
		Ethylbenzene	VOA - Aromatic
		Toluene	VOA - Aromatic
D011	Mixed Lab Solvents	Silver	RCRA Metal

TABLE 2-2

HAZARDOUS CONSTITUENT SUMMARY AND
CHEMICAL ANALYSIS STRATEGY
(CONT'D)

HAZARDOUS WASTE CODE	HAZARDOUS WASTE DESCRIPTION	HAZARDOUS WASTE CONSTITUENT	CONSTITUENT ANALYSIS GROUP
D001	Mixed Lab Solvents	Selenium Chloroform Pyridine	RCRA Metal VOA-Chlorinated BNA
U154	Methanol	Methanol	*
D018	Benzene	Benzene	VOA - Aromatic
F002	Mixed Lab Solvent	Phenol Dichlorobenzene Acetone	BNA BNA VOA-Ketone
U220	Off Specification Material	Toluene	VOA - Aromatic
D001	Process Waste	Styrene	VOA
P022	Carbon Disulfide	Carbon Disulfide	VOA
P106	Sodium Cyanide	Cyanide	Cyanide
P018	Brucine	Strychnidin-10-one, 2,3-dimethoxy	*
P039	Disulfoton	Phosphoridithioic acid, O,O-diethyl S-[2-(ethylthio) ethyl] ester	*
P005	Allyl Alcohol	2-Propen-1-ol	*
N/A	PCB	PCB	PCB

*No SW-846 analysis group has been identified for this constituent

3.0 INITIAL DECONTAMINATION PROCEDURES

3.1 Site Preparation

Prior to the decontamination activities, any solid material or debris present within the CWASA will be collected and containerized for characterization and subsequent disposal. Upon initiation of decontamination activities, access to the CWASA will be limited to authorized personnel only. All floor drains proximate to the CWASA will be sealed in a water tight manner to insure that no rinsate enters the sewer system during the decontamination process.

3.2 Decontamination Activities

All surfaces, including the floors, partitions, and walls (up to three feet above the floor) within the CWASA (see Figure 2-4) will be decontaminated using high pressure water (greater than 1000 psi) and an alkaline detergent. In addition, approximately four feet of the floor surface directly north of the CWASA will be decontaminated in the same manner. The detergent will be an alkaline degreaser such as Non-Butyl Degreaser #502-GX manufactured by All-Chem Corporation or the equivalent. After cleaning, all of the areas will be triple-rinsed with high pressure water. All cleaning and rinsing solutions will be retained and managed as described in Section 3.3.

3.3 Management of Decontamination Rinsates

All rinsates from the cleaning and rinsing of the CWASA floor, walls, and partitions will be collected and retained in a temporary on-site accumulation vessel(s) (drums or a bulk cargo tanker). A Wastewater sample(s) will be collected as necessary from the combined containerized rinsates and chemically and/or physically analyzed to determine if the accumulated wastewaters may be discharged to the Wayne County Department of Public Works wastewater treatment system.

Discharge of the decontamination rinsates and cleaning solutions may be subject to a special conditions discharge permit issued to BASF Corporation by the Wayne County Department of Public Works. If the acceptance criteria of the special discharge permit cannot be met, the wastes will be further characterized to determine the appropriate type of off-site disposal. If off-site disposal is indicated, the wastewaters will be properly characterized and transported to a licensed treatment/disposal facility.

3.4 Sampling & Chemical Analysis Plan

The effectiveness of the decontamination will be evaluated through chemical analyses of a representative sample of the final rinsate. Liquids generated from the third (final) rinse of the CWASA will be allowed to accumulate in the deepest portions of the bays. A total of nine representative samples, one from each bay, will be collected (see sample locations Figure 2-4). Discrete samples collected from each bay will then be composited into a single sample for chemical analysis.

The final rinsate sample will be chemically analyzed for the hazardous waste constituents most likely to be present and indicative of the presence of contamination resulting from hazardous waste management activities. The list of potential constituents presented in Table 2-2 was evaluated, and those having an SW-846 analysis method or which were components of wastes managed in the CWASA in significant quantities and have acceptable alternative analysis methods, were chosen as target analytes for decontamination verification analyses of the final rinsate sample. These analytes, and their respective analysis methods and method reporting limits (MRLs), are summarized in Table 3-1. The MRLs specified in Table 3-1 are consistent with analytical detection level guidance for environmental contamination response activities under Michigan Public Act 307 Rules (MERA Operational Memorandum #6, 10-1-92) and SW-846 protocols.

A representative sample of the combined rinsates will be collected from the accumulation vessel(s) using a stainless steel or Teflon bailer. It will be analyzed for the constiuents and properties necessary to obtain approval from the Wayne County Department of Public Works (WCDPW) to discharge the wastewaters to the sewer system. The actual list of analytes and respective MRLs will be determined on the basis of specific requirements to be established by the WCDPW for the wastestream.

All samples collected during this closure program will be preserved and managed according to standard USEPA SW-846 protocols. Samples destined for metals analyses will be collected in plastic bottles and preserved with nitric acid. Samples for analysis of the volatile organics fraction will be collected in sealed glass 40 ml VOA sample containers fitted with Teflon-lined septa and preserved with approximately 0.5 ml of 1:1 aqueous hydrochloric acid solution. Samples collected for analyses of the extractable organics fraction will be collected in sealed 1-liter precleaned, amber glass containers fitted with Teflon-lined lids. All samples for organics analyses will be stored at 4°C prior to analysis. All samples will be handled under a strict chain-of-custody protocol equivalent to that used by the USEPA in its CERCLA programs and will be delivered to the analytical laboratory within 24 hours of collection.

3.5 Data Evaluation

The results of chemical analyses described in Section 3.4 will be evaluated to verify the effectiveness of the CWASA decontamination. If any organic compound is measured at a concentration above the respective MRL (Table 3-1), residual contamination by that specie will be assumed to be present in the CWASA. If any target metal is measured at a concentration above the respective level in the source rinse water, residual contamination by that specie will be assumed to be present in the CWASA. If either of the conditions is found to exist, the activities described in the Contingent Assessment and Remediation Plan (Section 4) will be implemented. If neither of these conditions is found to exist, the decontamination will be deemed effective, and a closure report (Section 5) will be prepared.

TABLE 3-1

SUMMARY OF ANALYTES, ANALYSIS METHODS AND METHOD REPORTING LIMITS

ANALYTE	SW-846 METHOD	WATER METHOD REPORTING LIMIT ($\mu g/l$)
Organics		
Volatiles (chlorinated, aromatic, nitrile)	8240/8260	1.0 ea
Volatiles (ketones, carbon disulfide)	8240/8260	50.0 ea
Base-Neutral Extractables	8250/8270	5.0 ea
Acid Extractables	8250/8270	5.0 - 20.0 ea
PCBs	8080	0.1 ea
Toluene Diisocyanate	HPLC*	1000.0
Metals, Inorganics & Others		
Cadmium	7130	0.2
Chromium	7190	1.0
Selenium	7740	5.0
Silver	7760	0.5
Cyanide	9010	5.0

* Non-SW-846-Method

4.0 CONTINGENT ASSESSMENT AND REMEDIATION PLAN

4.1 Contingent Decontamination and Verification Plan

If any of the analytical parameters are found at concentrations greater than the specified limits (Section 3.4) in the final rinsate sample, additional decontamination activities will be conducted. Specifically, the decontamination and effectiveness processes described in Section 3 will be repeated. However, instead of compositing the final rinsate samples for verification analyses, samples from each of the nine bays will be individually analyzed and for only the residual contaminants identified in the previous analyses (Section 3.4). If residual contamination is again detected, the specific bay of concern can be identified.

4.2 Contingent Remedial Activities

If any of the target constituents are detected after the second decontamination, further investigation and study will be performed to determine the most cost effective way to identify and remediate the affected areas. After the remediation method is evaluated for feasibility and approved by BASF Corporation, it will be implemented. The goal of this program is to effect a clean closure of the waste storage area.

5.0 CLOSURE REPORT AND CERTIFICATION

At the conclusion of the clean closure program a report of activities and results will be prepared. This report will contain the following applicable items:

- Site decontamination and analysis procedures and results;
- Sampling locations and procedures;
- Technical and statistical evaluations of analysis data;
- Summary of closure activities including:
    - location of disposal site(s),
    - site management activities,
    - field observations,
    - actual schedule;
- Copies of all waste shipment manifests;
- "Clean check" sampling and analysis procedures and results;
- Summary of site restoration activities and land use projections;
- Copies of BASF approved closure plan.

6.0 CLOSURE SCHEDULE AND COST ESTIMATE

6.1 Closure Schedule

The following estimated schedule has been developed for the closure of the BASF Corporation CWASA:

ACTIVITY	DURATION
PROJECT MOBILIZATION	1-2 weeks
DECONTAMINATION	1 week
RINSATE ASSESSMENT	
Chemical analyses	4-5 weeks
Data evaluation/reporting	6-8 weeks
CONTINGENT ASSESSMENT AND REMEDIATION	To be determined as necessary

This schedule is highly susceptible to unforeseen technical and site difficulties.

6.2 Cost Estimate

The following cost estimates have been prepared for the anticipated closure activities. All costs are based on one decontamination event as described in section 3.0.

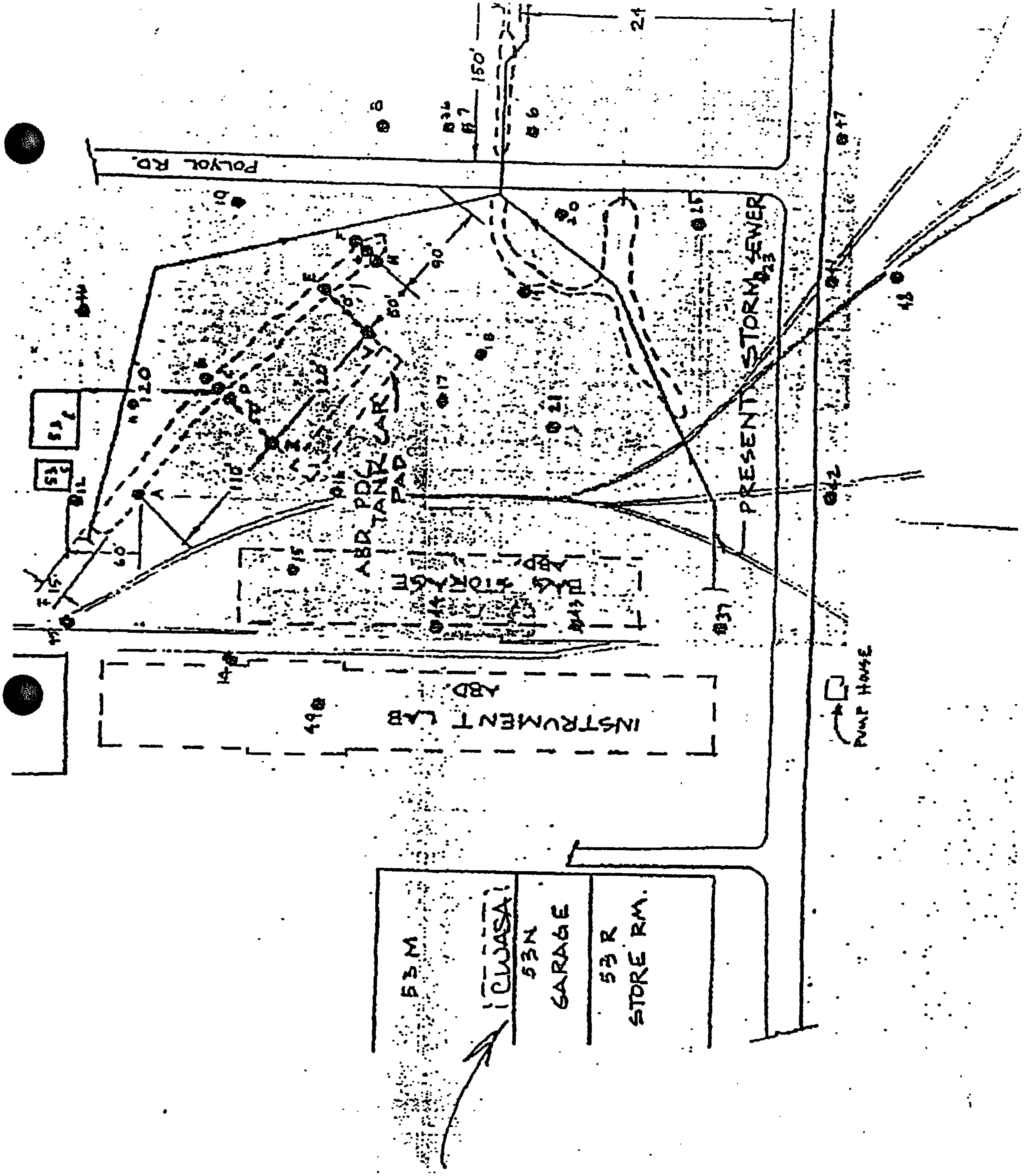
Closure Activities	Cost
Project Mobilization	
Scientist II, 4 Hours @ $62.00/Hour	$ 248.00
Senior Engineer I, 3 Hours @ $88.00/Hour	$ 264.00
Principal Scientist II, 2 Hours @ $150.00/Hour	$ 300.00
Decontamination Activities	
Labor, 48 Hours @ $30.00/Hour	$ 1,440.00
Spin Blaster, 12 Hours @ $44.28/Hour	$ 531.36
Pressure Washer 12 Hours @ $44.28/Hour	$ 531.36
Vacuum Tanker 24 Hours @ $79.68/Hour	$ 1,912.32
Scientist II, 24 Hours @ $62.00/Hour	$ 1,488.00
Rinsate Storage Vessel, (Mobilization and 1 Month Rental)	$ 2,260.00
Project Management, Scientist II, 4 Hours @ $62.00/Hour	$ 248.00
Chemical Analysis	
Table 3-1 Analytes (One set of analysis, final rinsate)	$ 1,710.00
Report Preparation	
Principal Scientist II, 10 Hours @ $150.00/Hour	$ 1,500.00
Senior Engineer I, 30 Hours @ $88.00/Hour	$ 2,640.00
Scientist II, 35 Hours @ $62.00/Hour	$ 2,170.00
Clerical, 10 Hours @ $45.00/Hour	$ 450.00
ESTIMATED TOTAL	$ 17,693.04

* Does not include special condition discharge permit parameters.

If initial closure assessment results indicate the need for additional assessment or remedial activities, cost estimates for these activities will be included in subsequent work plans submitted to BASF Corporation.

APPENDIX

SOIL BORING LOGS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INSTRUMENT LAB ABD.
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CLWASA
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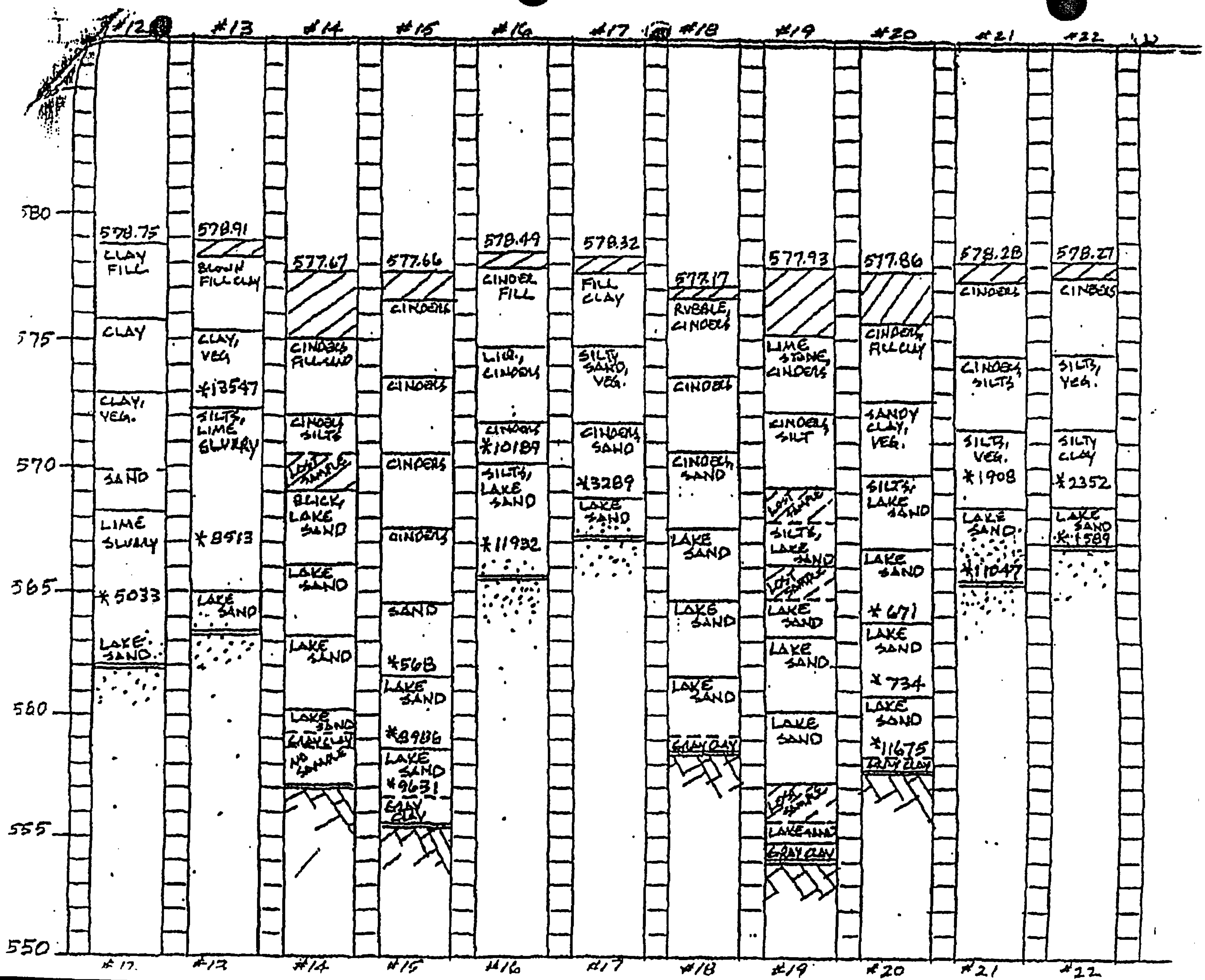
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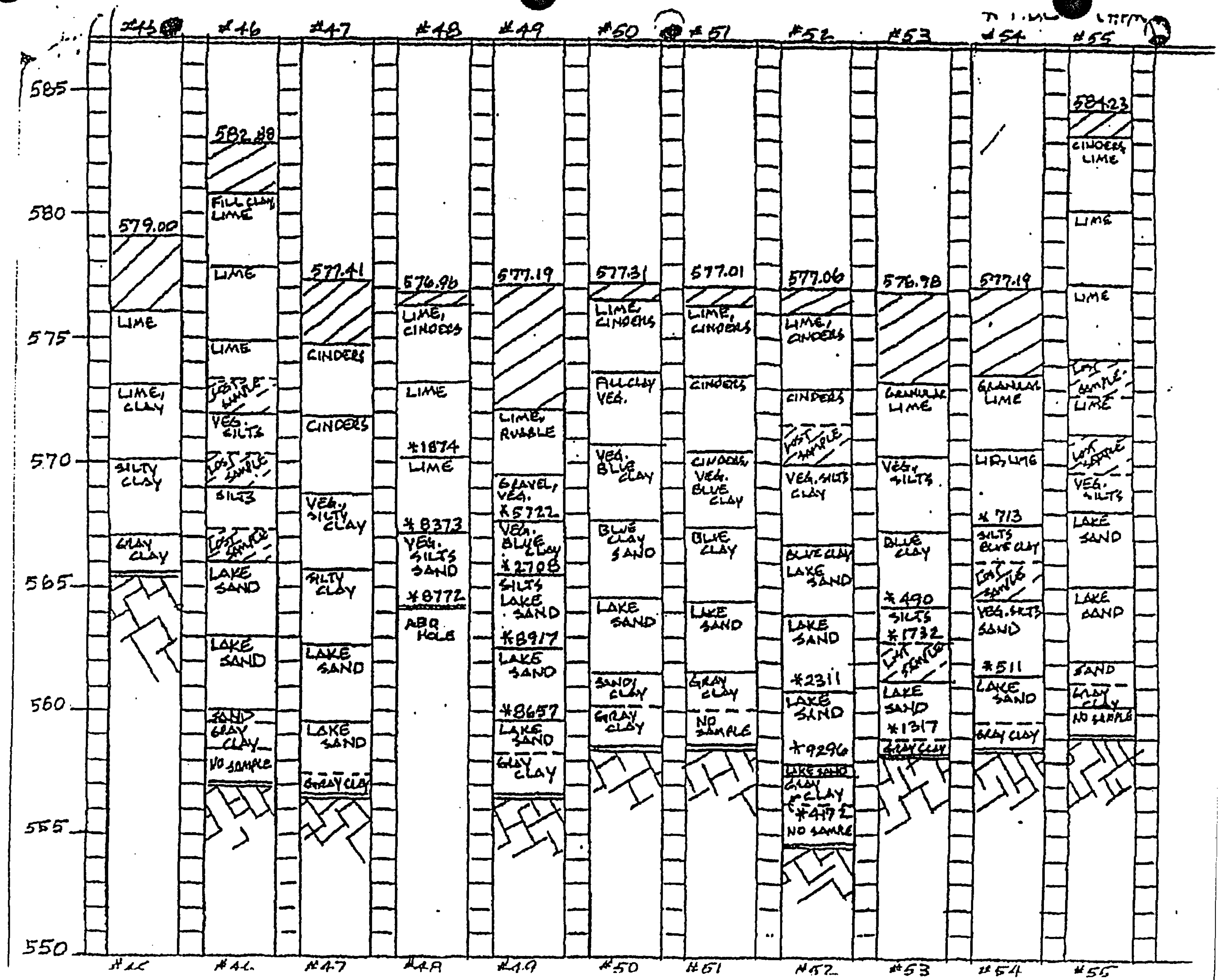
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GRAY CLAY
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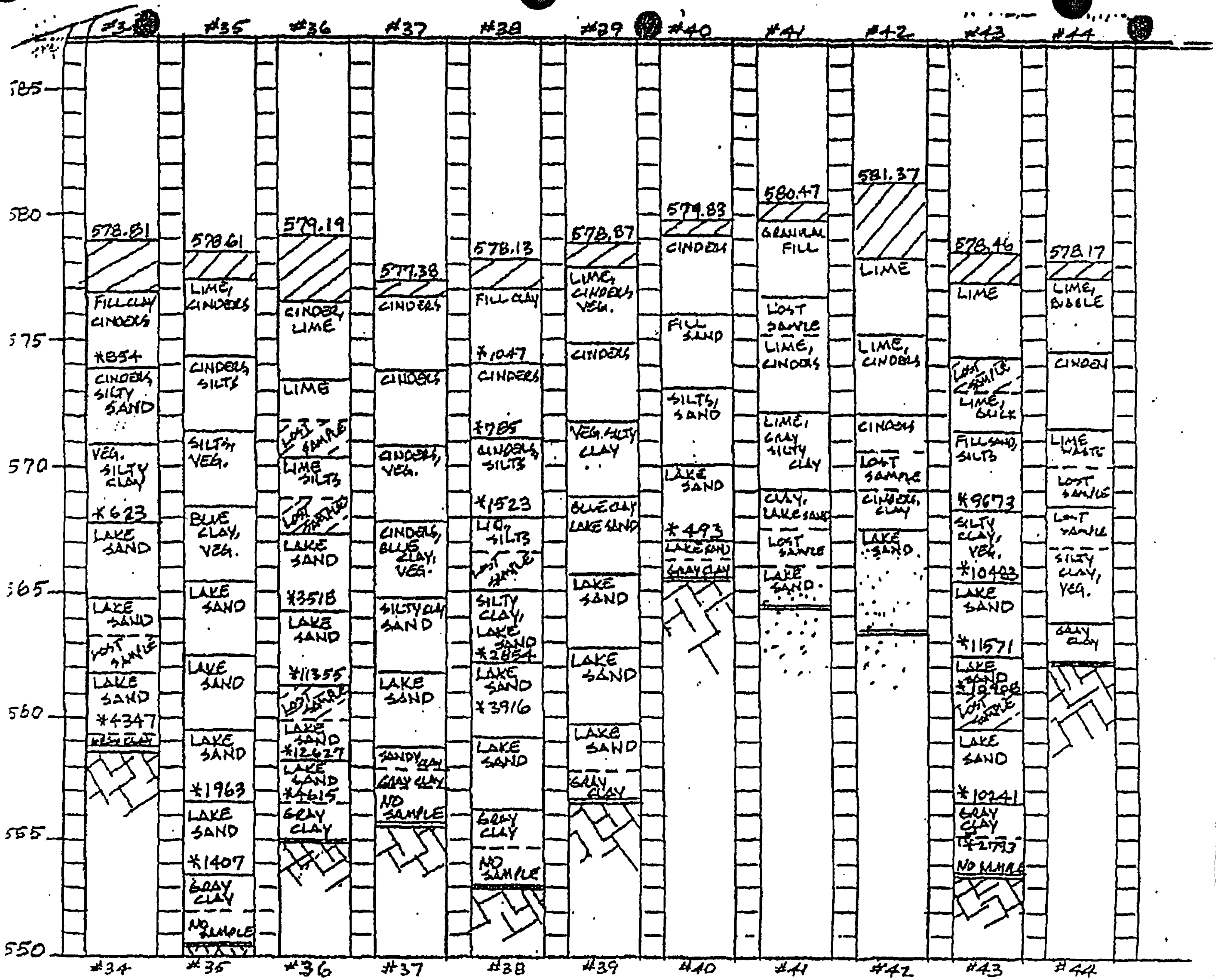


Techna Corporation
00276-01A
Revision 1

APPENDIX

SOIL BORING LOGS

Jun 22 1993

BASF Corporation
1609 Biddle Avenue
Wyandotte,MI 48192-3799

Attention: Adam Bickel

Dear Adam Bickel,

We thank you for providing Analytic & Biological Laboratories the opportunity to serve your analytical needs.

Enclosed you will find the final report on the analysis requested for the attached samples

The report includes the following: Results, Dates of Analysis, Method of Analysis, Levels of Detection, and QC/QA.

If you have any questions regarding the aforementioned report, please contact your Project Manager at (313) 477-6666.

Yours very truly,

J. Reagan
M. Hurwitz
Project Managers

Francis B. McLaughlin, FAIC
Director of Laboratories

Analytic & Biological Laboratories, Inc.
24350 INDOPLEX CIRCLE FARMINGTON HILLS, MICHIGAN 48335   (313) 477-6666   FAX (313) 477-4604

BASF Corporation

Sample #: L5614-1 (Project)

Description : WASH WATER

Matrix: Water Submitted: 11-JUN-93

PARAMETERS	RESULT	PQL	UNITS	MDL	METHOD
Total Cyanide	ND	.02	mg/l	.02	335.2
PCB-1016	ND	.01	mg/l	.01	608
PCB-1221	ND	.01	mg/l	.01	608
PCB-1232	ND	.01	mg/l	.01	608
PCB-1242	ND	.01	mg/l	.01	608
PCB-1248	ND	.01	mg/l	.01	608
PCB-1254	ND	.01	mg/l	.01	608
PCB-1260	ND	.01	mg/l	.01	608
Total Silver	ND	.007	mg/l	.007	6010
Total Cadmium	.004	.003	mg/l	.003	6010
Total Chromium	.021	.007	mg/l	.007	6010
Total Selenium	ND	.075	mg/l	.075	6010
SEMIVOLATILES					
Benzoic Acid	ND	10	ug/l	3	8270
4-Chloro-3-methylphenol	ND	10	ug/l	3	8270
2-Chlorophenol	ND	10	ug/l	3	8270
2,4-Dichlorophenol	ND	10	ug/l	3	8270
2,6-Dichlorophenol	ND	10	ug/l	3	8270
2,4-Dimethylphenol	ND	10	ug/l	3	8270
2-Methylphenol	ND	10	ug/l	3	8270
3&4-Methylphenol	ND	10	ug/l	3	8270
2-Nitrophenol	ND	10	ug/l	3	8270
4-Nitrophenol	ND	10	ug/l	3	8270
Pentachlorophenol	ND	10	ug/l	3	8270
Phenol	ND	10	ug/l	3	8270
2,3,4,6-Tetrachlorophenol	ND	10	ug/l	3	8270
2,4,5-Trichlorophenol	ND	10	ug/l	3	8270
2,4,6-Trichlorophenol	ND	10	ug/l	3	8270
Acenaphthene	ND	10	ug/l	3	8270
Acenaphthylene	ND	10	ug/l	3	8270
Anthracene	ND	10	ug/l	3	8270
Benzidine	ND	10	ug/l	3	8270
Benzo(a)anthracene	ND	10	ug/l	3	8270
Benzo(b+k)fluoranthene	ND	10	ug/l	3	8270

Analytic & Biological Laboratories, Inc.

24580 INDOPLEX CIRCLE FARMINGTON HILLS, MICHIGAN 48335 (313) 477-6666 FAX (313) 477-4604

BASF Corporation

Sample #: L5614-1 (Project)

Description : WASH WATER

Matrix: Water Submitted: 11-JUN-93

PARAMETERS	RESULT	PQL	UNITS	MDL	METHOD
Benzo(ghi)perylene	ND	10	ug/l	3	8270
Benzo(a)pyrene	ND	10	ug/l	3	8270
Benzyl alcohol	ND	10	ug/l	3	8270
Bis(2-Chlorethoxy)methane	ND	10	ug/l	3	8270
Bis(2-Chloroethyl)ether	ND	10	ug/l	3	8270
Bis(2-Chloroisopropyl)ether	ND	10	ug/l	3	8270
Bis(2-Ethylhexyl)phthalate	72	10	ug/l	3	8270
4-Bromophenyl phenyl ether	ND	10	ug/l	3	8270
Butyl benzyl phthalate	ND	10	ug/l	3	8270
4-Chloroaniline	ND	10	ug/l	3	8270
2-Chloronaphthalene	ND	10	ug/l	3	8270
4-Chlorophenyl phenyl ether	ND	10	ug/l	3	8270
Dibenzo(a,h)anthracene	ND	10	ug/l	3	8270
Dibenzofuran	ND	10	ug/l	3	8270
Chrysene	ND	10	ug/l	3	8270
Di-n-butyl phthalate	ND	10	ug/l	3	8270
1,3-Dichlorobenzene	ND	10	ug/l	3	8270
1,4-Dichlorobenzene	ND	10	ug/l	3	8270
1,2-Dichlorobenzene	ND	10	ug/l	3	8270
3,3'-Dichlorobenzidine	ND	10	ug/l	3	8270
3,4-Benzofluoranthene	ND	10	ug/l	3	8270
Diethyl phthalate	ND	10	ug/l	3	8270
Dimethyl phthalate	ND	10	ug/l	3	8270
2,4-Dinitrotoluene	ND	10	ug/l	3	8270
2,6-Dinitrotoluene	ND	10	ug/l	3	8270
Di-n-octyl phthalate	ND	10	ug/l	3	8270
1,2-Diphenylhydrazine	ND	10	ug/l	3	8270
Fluoranthene	ND	10	ug/l	3	8270
Fluorene	ND	10	ug/l	3	8270
Hexachlorobenzene	ND	10	ug/l	3	8270
Hexachlorobutadiene	ND	10	ug/l	3	8270
Hexachlorocyclopentadiene	ND	10	ug/l	3	8270
Hexachloroethane	ND	10	ug/l	3	8270
Indeno(1,2,3-cd)pyrene	ND	10	ug/l	3	8270
Isophorone	ND	10	ug/l	3	8270
2-Methylnaphthalene	ND	10	ug/l	3	8270

Analytic & Biological Laboratories, Inc.

[illegible] FARMINGTON HILLS, MICHIGAN [illegible] (313) 477-6666 FAX (313) 477-[illegible]

BASF Corporation

Sample #: L5614-1 (Project)

Description : WASH WATER

Matrix: Water Submitted: 11-JUN-93

PARAMETERS	RESULT	PQL	UNITS	MDL	METHOD
Naphthalene	ND	10	ug/l	3	8270
2-Nitroaniline	ND	10	ug/l	3	8270
3-Nitroaniline	ND	10	ug/l	3	8270
4-Nitroaniline	ND	10	ug/l	3	8270
Nitrobenzene	ND	10	ug/l	3	8270
n-Nitrosodimethylamine	ND	10	ug/l	3	8270
n-Nitrosodipropylamine	ND	10	ug/l	3	8270
n-Nitrosodiphenylamine	ND	10	ug/l	3	8270
Phenanthrene	ND	10	ug/l	3	8270
Pyrene	ND	10	ug/l	3	8270
1,2,4-Trichlorobenzene	ND	10	ug/l	3	8270
VOLATILES GC/MS					
Acetone	ND	10	ug/l	10	8240
Acrolein	ND	10	ug/l	10	8240
Acrylonitrile	ND	10	ug/l	10	8240
Benzene	ND	1	ug/l	1	8240
Bromodichloromethane	2	1	ug/l	1	8240
Bromoform	ND	1	ug/l	1	8240
Bromomethane	ND	5	ug/l	5	8240
2-Butanone	ND	10	ug/l	10	8240
Carbon disulfide	ND	1	ug/l	1	8240
Carbon tetrachloride	ND	1	ug/l	1	8240
Chlorobenzene	ND	1	ug/l	1	8240
Chlorodibromomethane	ND	1	ug/l	1	8240
Chloroethane	ND	5	ug/l	5	8240
2-Chloroethyl vinyl ether	ND	1	ug/l	1	8240
Chloroform	7.6	1	ug/l	1	8240
Chloromethane	ND	5	ug/l	5	8240
Dibromomethane	ND	1	ug/l	1	8240
Dichlorodifluoromethane	ND	5	ug/l	5	8240
1,1-Dichloroethane	ND	1	ug/l	1	8240
1,4-Dichloro-2-butene	ND	1	ug/l	1	8240
1,2-Dichloroethane	ND	1	ug/l	1	8240
1,1-Dichloroethene	ND	1	ug/l	1	8240

Analytic & Biological Laboratories, Inc.
23450 INDOPLEX CIRCLE FARMINGTON HILLS, MICHIGAN 48335 (313) 477-6000 FAX (313) 477-4604

BASF Corporation

Sample #: L5614-1 (Project)

Description : WASH WATER

Matrix: Water Submitted: 11-JUN-93

PARAMETERS	RESULT	PQL	UNITS	MDL	METHOD
trans-1,2-Dichloroethene	ND	1	ug/l	1	8240
1,2-Dichloropropane	ND	1	ug/l	1	8240
cis-1,3-Dichloropropene	ND	1	ug/l	1	8240
trans-1,3-Dichloropropene	ND	1	ug/l	1	8240
Ethylbenzene	ND	1	ug/l	1	8240
2-Hexanone	ND	10	ug/l	10	8240
Ethyl methacrylate	ND	1	ug/l	1	8240
Iodomethane	ND	1	ug/l	1	8240
Methylene chloride	ND	20	ug/l	1	8240
4-Methyl-2-pentanone	ND	10	ug/l	10	8240
Styrene	ND	1	ug/l	1	8240
1,1,2,2-Tetrachloroethane	ND	1	ug/l	1	8240
Tetrachloroethene	ND	1	ug/l	1	8240
Toluene	ND	1	ug/l	1	8240
1,1,1-Trichloroethane	ND	1	ug/l	1	8240
1,1,2-Trichloroethane	ND	1	ug/l	1	8240
Trichloroethene	ND	1	ug/l	1	8240
Trichlorofluoromethane	ND	5	ug/l	5	8240
1,2,3-Trichloropropane	ND	1	ug/l	1	8240
Vinyl acetate	ND	1	ug/l	1	8240
Vinyl chloride	ND	5	ug/l	5	8240
Xylenes	ND	1	ug/l	1	8240

Source: US EPA SW846 Methodology / 600 Series / AOAC
Note: ND denotes none detected above Practical Quantitative Limit

Janine Reagan/Martine Hurwitz
Project Managers

END OF REPORT

Analytic & Biological Laboratories, Inc.
24450 INDOPLEX CIRCLE FARMINGTON HILLS, MICHIGAN 48335 (313) 477-6666 FAX (313) 477-4604

PRECISION & ACCURACY

CONTROL DATA

DATE 06-15-93

COMPANY NAME: BASF Corporation

SAMPLE NUMBER:

L5614-1 - ________. # ________ - ________.

________ - ________. # ________ - ________.

PARAMETERS	SPIKE VALUE	RECOVERED VALUE	% RECOVERY
Aroclor 1232	2 ppm	2.2724 ppm	113.6

Analytic & Biological Laboratories, Inc.
24350 INDOPLEX CIRCLE FARMINGTON HILLS, MICHIGAN 48335 (313) 477-6666 FAX (313) 477-4664

Analytic & Biological Laboratories
Gas Chromatography - Mass Spectrometry Worksheet

Client: BASF Corp.
A&B Log No.: L5614-1
Analysis: E.P.A. Method 8270

Blank File: a618n
Extraction Amount (ml): 1000
Volume of Concentrate (ml): 1
olume of Concentrate with I.S. (ml): 1
Dilution Factor: 1

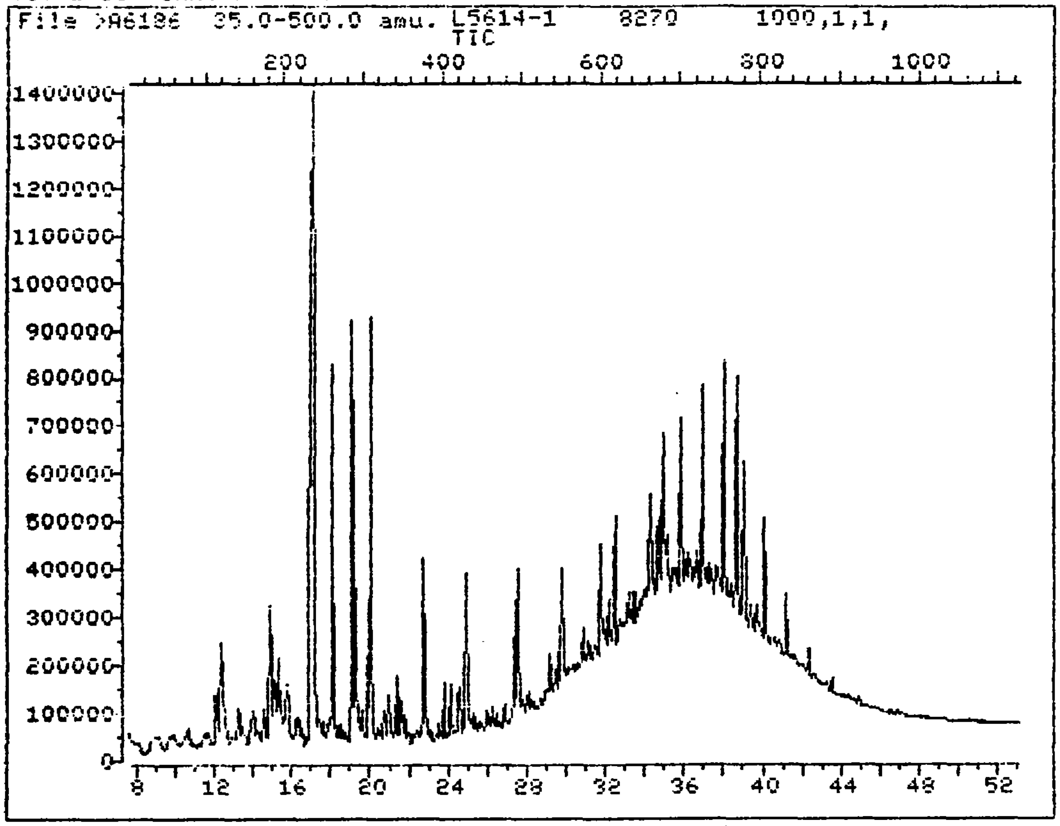
Acid Extractables	Amount Detected (ppb)	M.D.L. (ppb)	P.Q.L. (ppb)	Blank Amount (ppb)	Dilution Corrected Blank Amount (ppb)
Benzoic acid	N.D.	3	10	N.D.	N.D.
4-Chloro-3-methylphenol	N.D.	3	10	N.D.	N.D.
2-Chlorophenol	N.D.	3	10	N.D.	N.D.
2,4-Dichlorophenol	N.D.	3	10	N.D.	N.D.
2,6-Dichlorophenol	N.D.	3	10	N.D.	N.D.
2,4-Dimethylphenol	N.D.	3	10	N.D.	N.D.
4,6-Dinitro-2-methylphenol	N.D.	3	10	N.D.	N.D.
2,4-Dinitrophenol	N.D.	3	10	N.D.	N.D.
2-Methylphenol (o-Cresol)	N.D.	3	10	N.D.	N.D.
3&4-Methylphenol (m&p-Cresol)	N.D.	3	10	N.D.	N.D.
-Nitrophenol	N.D.	3	10	N.D.	N.D.
4-Nitrophenol	N.D.	3	10	N.D.	N.D.
Pentachlorophenol	N.D.	3	10	N.D.	N.D.
Phenol	N.D.	3	10	N.D.	N.D.
2,3,4,6-Tetrachlorophenol	N.D.	3	10	N.D.	N.D.
2,4,5-Trichlorophenol	N.D.	3	10	N.D.	N.D.
2,4,6-Trichlorophenol	N.D.	3	10	N.D.	N.D.

Base Neutral Extractables					
Acenaphthene	N.D.	3	10	N.D.	N.D.
Acenaphthylene	N.D.	3	10	N.D.	N.D.
Anthracene	N.D.	3	10	N.D.	N.D.
Benzidine	N.D.	3	10	N.D.	N.D.
Benzo(a)anthracene	N.D.	3	10	N.D.	N.D.
Benzo(b&k)fluoranthene	N.D.	3	10	N.D.	N.D.
Benzo(ghi)perylene	N.D.	3	10	N.D.	N.D.
Benzo(a)pyrene	N.D.	3	10	N.D.	N.D.
Benzyl alcohol	N.D.	3	10	N.D.	N.D.
bis(2-Chlorethoxy)methane	N.D.	3	10	N.D.	N.D.
bis(2-Chloroethyl)ether	N.D.	3	10	N.D.	N.D.
bis(2-Chloroisopropyl)ether	N.D.	3	10	N.D.	N.D.
bis(2-Ethylhexyl)phthalate	72	3	10	N.D.	N.D.

Client: BASF Corp. A&B Log No.: L5614-1		Amount Detected (ppb)	M.D.L. (ppb)	P.Q.L. (ppb)	Blank Amount (ppb)	Corrected Blank Amount (ppb)
4-Bromophenyl phenyl ether		N.D.	3	10	N.D.	N.D.
Butyl benzylphthalate		N.D.	3	10	N.D.	N.D.
4-Chloroaniline		N.D.	3	10	N.D.	N.D.
4-Chlorophenyl phenyl ether		N.D.	3	10	N.D.	N.D.
Dibenzo(a,h)anthracene		N.D.	3	10	N.D.	N.D.
Dibenzofuran		N.D.	3	10	N.D.	N.D.
Chrysene		N.D.	3	10	N.D.	N.D.
Di-n-butyl phthalate	<	5	3	10	N.D.	N.D.
1,3-Dichlorobenzene		N.D.	3	10	N.D.	N.D.
1,4-Dichlorobenzene		N.D.	3	10	N.D.	N.D.
1,2-Dichlorobenzene		N.D.	3	10	N.D.	N.D.
3,3'-Dichlorobenzidine		N.D.	3	10	N.D.	N.D.
3,4-Benzofluoranthene		N.D.	3	10	N.D.	N.D.
Diethylphthalate		N.D.	3	10	N.D.	N.D.
Dimethylphthalate		N.D.	3	10	N.D.	N.D.
2,4-Dinitrotoluene		N.D.	3	10	N.D.	N.D.
2,6-Dinitrotoluene		N.D.	3	10	N.D.	N.D.
Di-n-octyl phthalate	<	5	3	10	N.D.	N.D.
1,2-Diphenylhydrazine		N.D.	3	10	N.D.	N.D.
Fluoranthene		N.D.	3	10	N.D.	N.D.
Fluorene		N.D.	3	10	N.D.	N.D.
Hexachlorobenzene		N.D.	3	10	N.D.	N.D.
Hexachlorobutadiene		N.D.	3	10	N.D.	N.D.
Hexachlorocyclopentadiene		N.D.	3	10	N.D.	N.D.
Hexachloroethane		N.D.	3	10	N.D.	N.D.
Indeno(1,2,3-cd)pyrene		N.D.	3	10	N.D.	N.D.
Isophorone		N.D.	3	10	N.D.	N.D.
2-Methylnaphthalene		N.D.	3	10	N.D.	N.D.
Naphthalene		N.D.	3	10	N.D.	N.D.
2-Nitroaniline		N.D.	3	10	N.D.	N.D.
3-Nitroaniline		N.D.	3	10	N.D.	N.D.
4-Nitroaniline		N.D.	3	10	N.D.	N.D.
Nitrobenzene		N.D.	3	10	N.D.	N.D.
n-Nitrosodi-n-butylamine		N.D.	3	10	N.D.	N.D.
n-Nitrosodimethylamine		N.D.	3	10	N.D.	N.D.
n-Nitrosodipropylamine		N.D.	3	10	N.D.	N.D.
Phenanthrene		N.D.	3	10	N.D.	N.D.
Pyrene		N.D.	3	10	N.D.	N.D.
1,2,4-Trichlorobenzene		N.D.	3	10	N.D.	N.D.
Pyrene		N.D.	3	10	N.D.	N.D.

N.D. : indicates the compound was Not Detected in the sample
M.D.L. : Method Detection Limit
P.Q.L. : Practical Quantitation Limit

TOTAL ION CHROMATOGRAM



Data File: >A6186::A0 Quant Output File: ^A6186::D4
Name: L5614-1 8270
Misc: 1000,1,1, BASF Corp. - BTL# 9

Id File: ID625::A5
Title: BNA IDENTIFICATION FILE
Last Calibration: 930607 14:50

Operator ID: JUDY
Quant Time: 930619 02:30
Injected at: 930619 01:37

QUANT REPORT

Operator ID: JUDY   Quant Rev: 6   Quant Time: 930619 02:30
Output File: ^A6186::D4   Injected at: 930619 01:37
Data File: >A6186::A0   Dilution Factor: 1.00000
Name: L5614-1   8270
Misc: 1000,1,1,   BASF Corp.   BTL# 9

ID File: ID625::A5
Title: BNA IDENTIFICATION FILE
Last Calibration: 930607 14:50

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	15.25	192	174557	40.00	uG/L	87
29)	*d8-Naphthylene	19.21	290	543513	40.00	uG/L	81
44)	*d10-Acenaphthene	24.90	431	370565	40.00	uG/L	96
63)	*d10-Phenanthrene	29.75	551	578701	40.00	uG/L	90
68)	Di-n-Butylphthalate	31.86	603	27531	1.17	uG/L	97
75)	*d12-Chrysene	38.59	769	179445	40.00	uG/L	89
78)	bis(2-Ethylhexyl)phthalate	38.67	771	524235	71.75	uG/L	77
79)	Di-n-Octylphthalate	40.66	820	15294	1.57	uG/L	100
82)	*d12-Perylene	44.11	905	51484	40.00	uG/L	95

* Compound is ISTD

QUANT REPORT

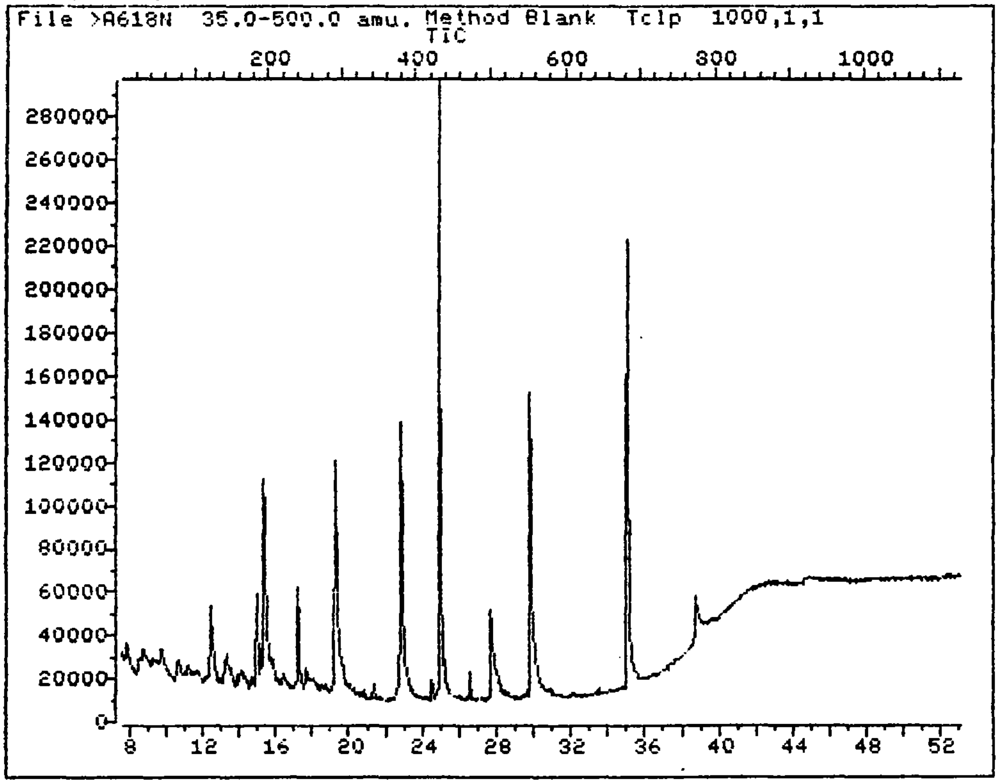
Operator ID: JUDY Quant Rev: 6 Quant Time: 930621 16:25
Output File: ^S6186::A5 Injected at: 930619 01:37
Data File: >A6186::A0 Dilution Factor: 1.00000
Name: L5614-1 8270
Misc: 1000,1,1, BASF Corp. BTL# 9

ID File: IDBSS::A5
Title: SURROGATE STANDARD PERCENT RECOVERY REPORT
Last Calibration: 930621 16:07

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	15.25	192	174557	100.00	%	87
2)	2-Fluorophenol (Surrogate)	12.31	119	151180	10.83	%	98
4)	d5-Nitrobenzene (Surrogate)	17.15	239	187692	36.06	%	85
5)	*d8-Naphthylene	19.21	290	543513	100.00	%	81
6)	2-Fluorobiphenyl (Surrogate)	22.76	378	526583	65.28	%	86
7)	*d10-Acenaphthene	24.90	431	370565	100.00	%	96
8)	2,4,6-Tribromophenol (Surr.)	27.53	496	328984	89.44	%	83
9)	*d10-Phenanthrene	29.75	551	578701	100.00	%	90
10)	d14-p-Terphenyl (Surrogate)	35.02	681	323418	41.26	%	73
11)	*d12-Chrysene	38.59	769	182339	100.00	%	89
12)	*d12-Perylene	44.11	905	51484	100.00	%	95

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >A618N::A0 Quant Output File: ^A618N::A5
Name: Method Blank Tclp
Misc: 1000,1,1 5579 BTL# 3

Id File: ID625::A5
Title: BNA IDENTIFICATION FILE
Last Calibration: 930607 14:50

Operator ID: JUDY
Quant Time: 930622 11:28
Injected at: 930618 19:18

QUANT REPORT

Operator ID: JUDY
Output File: ^A618N::A5
Data File: >A618N::A0
Name: Method Blank Tclp
Misc: 1000,1,1 5579

Quant Rev: 6 Quant Time: 930622 11:28
Injected at: 930618 19:18
Dilution Factor: 1.00000
BTL# 3

ID File: ID625::A5
Title: BNA IDENTIFICATION FILE
Last Calibration: 930607 14:50

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	15.33	194	181527	40.00	uG/L	93
29)	*d8-Naphthylene	19.24	291	619872	40.00	uG/L	61
44)	*d10-Acenaphthene	24.93	432	377171	40.00	uG/L	94
63)	*d10-Phenanthrene	29.81	553	523994	40.00	uG/L	87
75)	*d12-Chrysene	38.73	774	125604	40.00	uG/L	92
82)	*d12-Perylene	44.63	920	9040	40.00	uG/L	92

* Compound is ISTD

QUANT REPORT

Operator ID: JUDY   Quant Rev: 6   Quant Time: 930621 16:20
Output File: ^S618N::A5   Injected at: 930618 19:18
Data File: >A618N::A0   Dilution Factor: 1.00000
Name: Method Blank Tclp
Misc: 1000,1,1   5579   BTL# 3

ID File: IDBSS::A5
Title: SURROGATE STANDARD PERCENT RECOVERY REPORT
Last Calibration: 930621 16:07

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	15.33	194	182145	100.00	%	93
2)	2-Fluorophenol (Surrogate)	13.36	145	89286M	6.13	%	81
3)	d5-Phenol (Surrogate)	16.22	216	61973M	8.80	%	
4)	d5-Nitrobenzene (Surrogate)	17.67	252	51950	9.57	%	88
5)	*d8-Naphthylene	19.24	291	644116	100.00	%	62
6)	2-Fluorobiphenyl (Surrogate)	22.83	380	385399	40.32	%	88
7)	*d10-Acenaphthene	24.93	432	377171	100.00	%	94
8)	2,4,6-Tribromophenol (Surr.)	27.67	500	90659	24.22	%	87
9)	*d10-Phenanthrene	29.81	553	530454	100.00	%	87
10)	d14-p-Terphenyl (Surrogate)	35.05	683	566447	78.83	%	79
11)	*d12-Chrysene	38.73	774	125604	100.00	%	92
12)	*d12-Perylene	44.63	920	9040	100.00	%	92

* Compound is ISTD

Analytic & Biological Laboratories
Gas Chromatography - Mass Spectrometry Worksheet

Client: BASF Corporation
A&B Log No.: L5614-1
Analysis: E.P.A. Method 8240

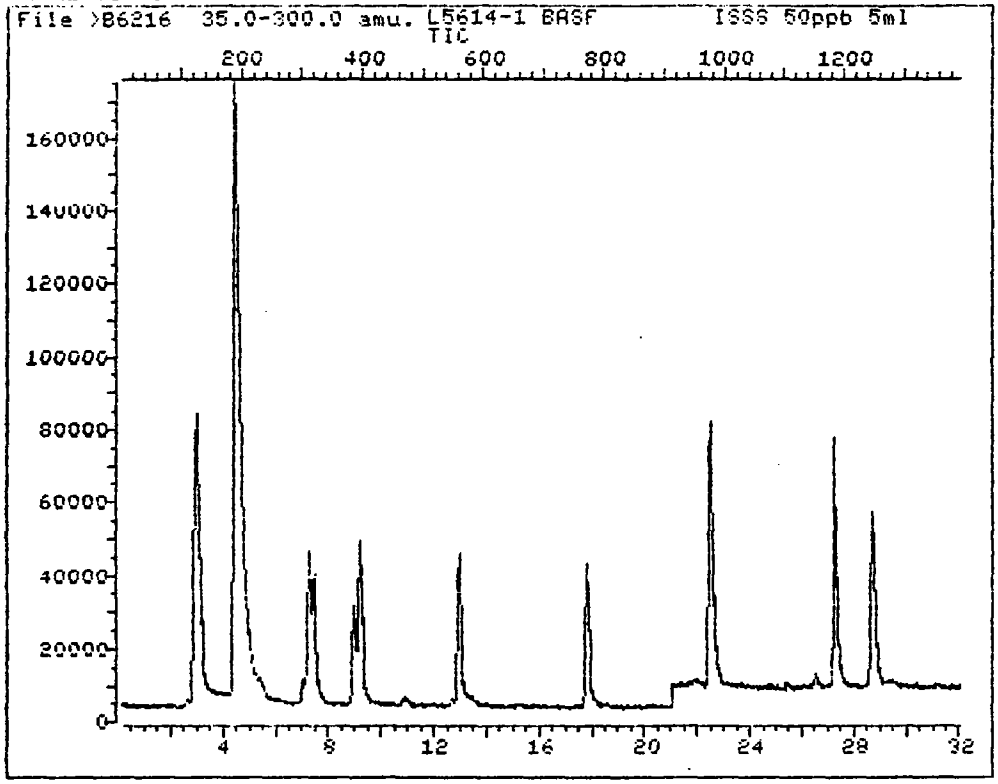
Amount Purged: 5
Blank File: B621N
Dilution Factor: 1

Compounds	Amount Detected (ppb)	M.Q.L. (ppb)	P.Q.L. (ppb)	Amount Detected in Blank (ppb)	Dilution Corrected Blank Amt. (ppb)
Acetone	N.D.	10	10	N.D.	N.D.
Acrolein	N.D.	10	10	N.D.	N.D.
Acrylonitrile	N.D.	10	10	N.D.	N.D.
Benzene	N.D.	1	1	N.D.	N.D.
Bromodichloromethane	2	1	1	N.D.	N.D.
Bromoform	N.D.	1	1	N.D.	N.D.
Bromomethane	N.D.	5	5	N.D.	N.D.
2-Butanone (MEK)	N.D.	10	10	N.D.	N.D.
Carbon disulfide	N.D.	1	1	N.D.	N.D.
Carbon tetrachloride	N.D.	1	1	N.D.	N.D.
Chlorobenzene	N.D.	1	1	N.D.	N.D.
Chlorodibromomethane	N.D.	1	1	N.D.	N.D.
Chloroethane	N.D.	5	5	N.D.	N.D.
2-Chloroethyl vinyl ether	N.D.	1	1	N.D.	N.D.
Chloroform	7.6	1	1	N.D.	N.D.
Chloromethane	N.D.	5	5	N.D.	N.D.
Dibromomethane	N.D.	1	1	N.D.	N.D.
1,4-Dichloro-2-butene	N.D.	1	1	N.D.	N.D.
Dichlorodifluoromethane	N.D.	5	5	N.D.	N.D.
1,1-Dichloroethane	N.D.	1	1	N.D.	N.D.
1,2-Dichloroethane	N.D.	1	1	N.D.	N.D.
1,1-Dichloroethene	N.D.	1	1	N.D.	N.D.
trans-1,2-Dichloroethene	N.D.	1	1	N.D.	N.D.
1,2-Dichloropropane	N.D.	1	1	N.D.	N.D.
cis-1,3-Dichloropropene	N.D.	1	1	N.D.	N.D.
trans-1,3-Dichloropropene	N.D.	1	1	N.D.	N.D.
Ethylbenzene	N.D.	1	1	N.D.	N.D.
Ethyl methacrylate	N.D.	1	1	N.D.	N.D.
2-Hexanone	N.D.	10	10	N.D.	N.D.
Iodomethane	N.D.	1	1	N.D.	N.D.

Compounds		Amount Detected (ppb)	M.Q.L. (ppb)	P.Q.L. (ppb)	Amount Detected in Blank (ppb)	Dilution Corrected Blank Amt. (ppb)
Methylene chloride	* <	5	1	20	<10	<10
4-Methyl-2-pentanone (MIBK)		N.D.	10	10	N.D.	N.D.
Styrene		N.D.	1	1	N.D.	N.D.
1,1,2,2-Tetrachloroethane		N.D.	1	1	N.D.	N.D.
Tetrachloroethene		N.D.	1	1	N.D.	N.D.
Toluene		N.D.	1	1	N.D.	N.D.
1,1,1-Trichloroethane		N.D.	1	1	N.D.	N.D.
1,1,2-Trichloroethane		N.D.	1	1	N.D.	N.D.
Trichloroethene		N.D.	1	1	N.D.	N.D.
Trichlorofluoromethane		N.D.	5	5	N.D.	N.D.
1,2,3-Trichloropropane		N.D.	1	1	N.D.	N.D.
Vinyl acetate		N.D.	1	1	N.D.	N.D.
Vinyl chloride		N.D.	5	5	N.D.	N.D.
Xylenes (total)		N.D.	1	1	N.D.	N.D.

* : indicates the compound was detected in the blank
N.D. : indicates the compound was Not Detected
M.Q.L. : Method Quantitation Limit
P.Q.L. : Practical Quantitation Limit

TOTAL ION CHROMATOGRAM



Data File: >B6216::D6 Quant Output File: ^B6216::D4
Name: L5614-1 BASF
Misc: ISSS 50ppb 5ml

Id File: VOLID::D5
Title: VOLATILES IDENTIFICATION FILE
Last Calibration: 930616 16:06

Operator ID: SARMA
Quant Time: 930622 02:47
Injected at: 930622 02:09

QUANT REPORT

Operator ID: SARMA Quant Rev: 6 Quant Time: 930622 02:47
Output File: ^B6216::D4 Injected at: 930622 02:09
Data File: >B6216::D6 Dilution Factor: 1.00000
Name: L5614-1 BASF
Misc: ISSS 50ppb 5ml

ID File: VOLID::D5
Title: VOLATILES IDENTIFICATION FILE
Last Calibration: 930616 16:06

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.25	311	126935	50.00	ug/l	100
13)	Methylene chloride	5.02	214	5198	2.85	ug/l	100
21)	Chloroform	7.06	303	26874	7.60	ug/l	90
25)	*Fluorobenzene	8.97	386	119481	50.00	ug/l	100
29)	*1,4-Difluorobenzene	9.17	395	166632	50.00	ug/l	100
32)	Bromodichloromethane	10.87	469	5322	2.02	ug/l	88
37)	*d5-Chlorobenzene	17.76	770	121669	50.00	ug/l	100
53)	*d4-1,4-Dichlorobenzene	27.23	1183	98193	50.00	ug/l	100

* Compound is ISTD

QUANT REPORT

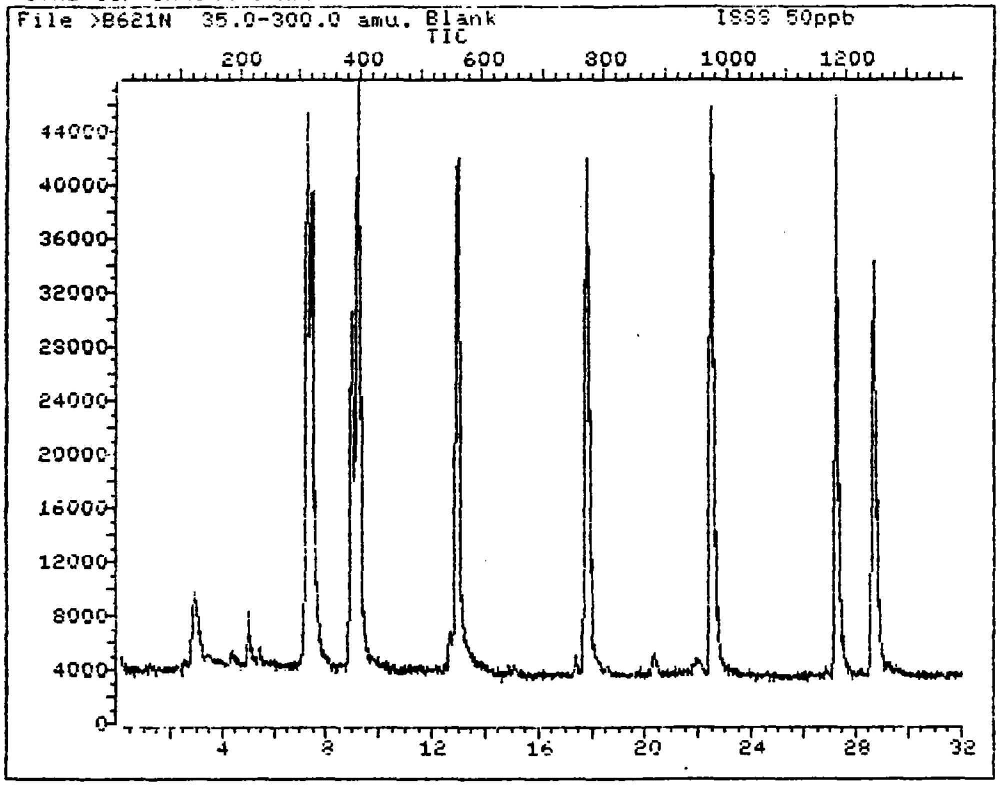
Operator ID: SARMA
Quant Rev: 6   Quant Time: 930622 08:37
Output File: ^Z6216::QT   Injected at: 930622 02:09
Data File: >B6216::D6   Dilution Factor: 1.00000
Name: L5614-1 BASF
Misc: ISSS 50ppb 5ml

ID File: VOLSR::DS
Title: SURROGATE RECOVERY FILE
Last Calibration: 930622 08:32

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.25	311	126935	100.00	%	100
2)	Dibromofluoromethane (SS)	7.43	319	105508	116.16	%	100
3)	*Fluorobenzene	8.97	386	119481	100.00	%	100
4)	*1,4-Difluorobenzene	9.17	395	166632	100.00	%	100
5)	d8-Toluene (SS)	12.93	559	144191	108.77	%	97
6)	*d5-Chlorobenzene	17.76	770	121669	100.00	%	100
7)	4-Bromofluorobenzene (SS)	22.49	976	99628	91.11	%	100
8)	*d4-1,4-Dichlorobenzene	27.23	1183	98193	100.00	%	100
9)	d4-1,2-Dichlorobenzene (SS)	28.73	1248	73579	103.70	%	100

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >B621N::D6 Quant Output File: ^B621N::D4
Name: Blank
Misc: ISSS 50ppb

Id File: VOLID::D5
Title: VOLATILES IDENTIFICATION FILE
Last Calibration: 930616 16:06

Operator ID: SARMA
Quant Time: 930621 20:35
Injected at: 930621 19:57

QUANT REPORT

Operator ID: SARMA
Output File: ^B621N::D4
Data File: >B621N::D6
Name: Blank
Misc: ISSS 50ppb

Quant Rev: 6 Quant Time: 930621 20:35
Injected at: 930621 19:57
Dilution Factor: 1.00000

ID File: VOLID::D5
Title: VOLATILES IDENTIFICATION FILE
Last Calibration: 930616 16:06

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.25	311	135030	50.00	ug/l	100
13)	Methylene chloride	5.00	213	8372	4.31	ug/l	100
25)	*Fluorobenzene	8.96	386	117780	50.00	ug/l	100
29)	*1,4-Difluorobenzene	9.17	395	163179	50.00	ug/l	100
37)	*d5-Chlorobenzene	17.79	771	123389	50.00	ug/l	100
53)	*d4-1,4-Dichlorobenzene	27.20	1182	65224	50.00	ug/l	100

* Compound is ISTD

QUANT REPORT

Operator ID: SARMA
Output File: ^Z621N::QT
Data File: >B621N::D6
Name: Blank
Misc: ISSS 50ppb

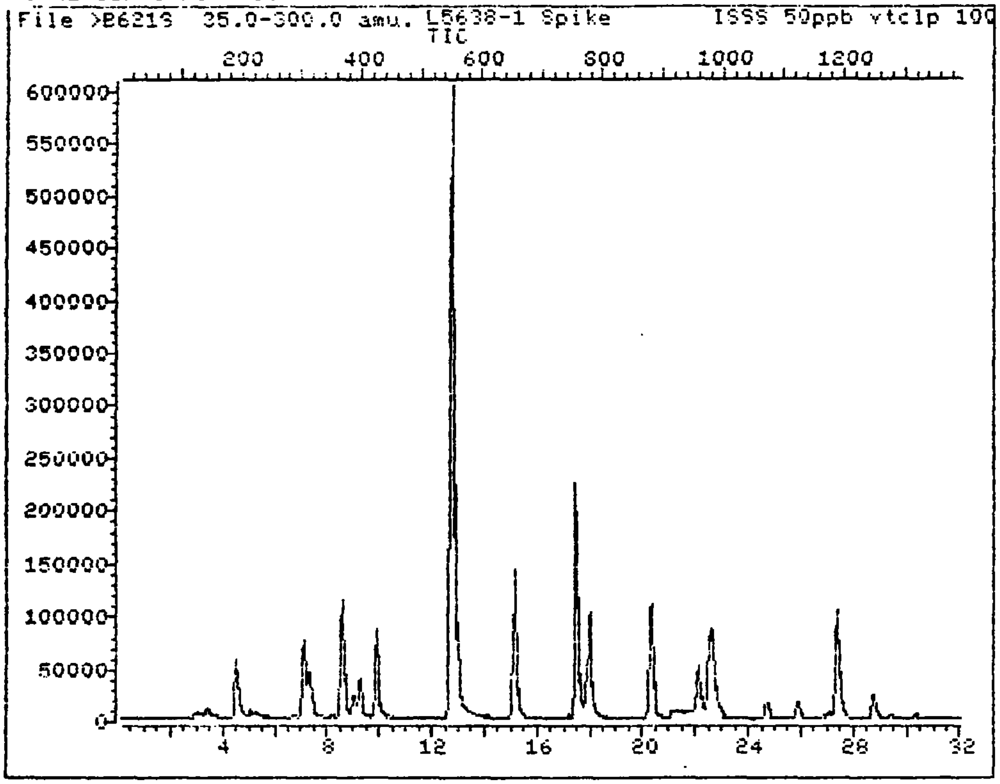
Quant Rev: 6 Quant Time: 930622 08:35
Injected at: 930621 19:57
Dilution Factor: 1.00000

ID File: VOLSR::D5
Title: SURROGATE RECOVERY FILE
Last Calibration: 930622 08:32

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.25	311	135030	100.00	%	100
2)	Dibromofluoromethane (SS)	7.43	319	103272	106.88	%	100
3)	*Fluorobenzene	8.96	386	117780	100.00	%	100
4)	*1,4-Difluorobenzene	9.17	395	163179	100.00	%	100
5)	d8-Toluene (SS)	12.91	558	137769	106.13	%	97
6)	*d5-Chlorobenzene	17.79	771	123389	100.00	%	100
7)	4-Bromofluorobenzene (SS)	22.46	975	62027	55.93	%	100
8)	*d4-1,4-Dichlorobenzene	27.20	1182	65224	100.00	%	100
9)	d4-1,2-Dichlorobenzene (SS)	28.67	1246	49560	105.15	%	100

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >B621S::D6 Quant Output File: ^Y621S::QT
Name: L5638-1 Spike
Misc: ISSS 50ppb vtclp 100ppb

Id File: VOLMS::D5
Title: VOLATILES MATRIX SPIKE
Last Calibration: 930622 08:31

Operator ID: SARMA
Quant Time: 930622 08:32
Injected at: 930621 17:18

QUANT REPORT

Operator ID: SARMA   Quant Rev: 6   Quant Time: 930622 08:32
Output File: ^Y621S::QT   Injected at: 930621 17:18
Data File: >B621S::D6   Dilution Factor: 1.00000
Name: L5638-1 Spike
Misc: ISSS 50ppb vtclp 100ppb

ID File: VOLMS::D5
Title: VOLATILES MATRIX SPIKE
Last Calibration: 930622 08:31

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.29	313	112975	100.00	%	100
2)	Vinyl chloride	3.37	142	58014	86.74	%	89
3)	1,1-Dichloroethene	4.52	192	188761	86.26	%	94
4)	2-Butanone (MEK)	6.67	286	3979	88.50	%	93
5)	Chloroform	7.09	304	286280	91.00	%	100
6)	*Fluorobenzene	8.99	387	95118	100.00	%	100
7)	1,2-Dichloroethane	8.55	368	131058	86.70	%	92
8)	Carbon tetrachloride	8.16	351	7861	3.48	%	85
9)	Benzene	8.53	367	335604	88.02	%	84
10)	*1,4-Difluorobenzene	9.22	397	132865	100.00	%	100
11)	Trichloroethene	9.84	424	148803	78.55	%	87
12)	*d5-Chlorobenzene	17.84	773	98012	100.00	%	100
13)	Tetrachloroethene	15.16	656	142472	83.04	%	97
14)	Chlorobenzene	17.95	778	271817	78.90	%	94
15)	*d4-1,4-Dichlorobenzene	27.29	1185	52624	100.00	%	100
16)	1,4-Dichlorobenzene	27.40	1190	218704	77.99	%	96

* Compound is ISTD

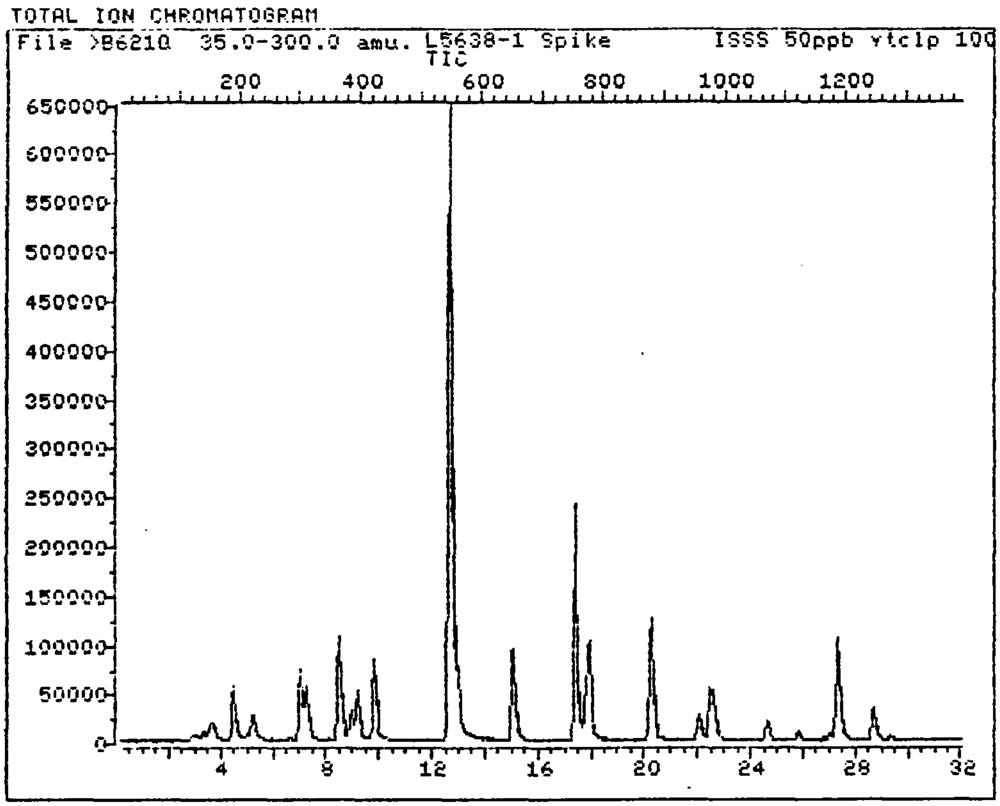
QUANT REPORT

Operator ID: SARMA Quant Rev: 6 Quant Time: 930622 08:34
Output File: ^Z621S::QT Injected at: 930621 17:18
Data File: >B621S::D6 Dilution Factor: 1.00000
Name: L5638-1 Spike
Misc: ISSS 50ppb vtclp 100ppb

ID File: VOLSR::D5
Title: SURROGATE RECOVERY FILE
Last Calibration: 930622 08:32

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.29	313	112975	100.00	%	100
2)	Dibromofluoromethane (SS)	7.45	320	11547	14.28	%	100
3)	*Fluorobenzene	8.99	387	95118	100.00	%	100
4)	*1,4-Difluorobenzene	9.22	397	132865	100.00	%	100
5)	d8-Toluene (SS)	12.98	561	111968	105.93	%	95
6)	*d5-Chlorobenzene	17.84	773	98012	100.00	%	100
7)	4-Bromofluorobenzene (SS)	22.52	977	90180	102.37	%	100
8)	*d4-1,4-Dichlorobenzene	27.29	1185	52624	100.00	%	100
9)	d4-1,2-Dichlorobenzene (SS)	28.75	1249	38478	101.19	%	100

* Compound is ISTD



Data File: >B621Q::D6

Quant Output File: ^Y621Q::QT

Name: L5638-1 Spike
Misc: ISSS 50ppb vtclp 100ppb

Id File: VOLMS::D5
Title: VOLATILES MATRIX SPIKE
Last Calibration: 930622 08:31

Operator ID: SARMA
Quant Time: 930622 08:33
Injected at: 930621 18:11

QUANT REPORT

Operator ID: SARMA　　Quant Rev: 6　　Quant Time: 930622 08:33
Output File: ^Y621Q::QT　　Injected at: 930621 18:11
Data File: >B621Q::D6　　Dilution Factor: 1.00000
Name: L5638-1 Spike
Misc: ISSS 50ppb vtclp 100ppb

ID File: VOLMS::D5
Title: VOLATILES MATRIX SPIKE
Last Calibration: 930622 08:31

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.22	310	150881	100.00	%	100
2)	Vinyl chloride	3.35	141	51949	58.16	%	92
3)	1,1-Dichloroethene	4.47	190	171872	58.81	%	93
4)	2-Butanone (MEK)	6.65	285	3356	55.89	%	93
5)	Chloroform	7.04	302	273624	65.13	%	100
6)	*Fluorobenzene	8.94	385	128198	100.00	%	100
7)	1,2-Dichloroethane	8.51	366	125396	61.55	%	92
8)	Carbon tetrachloride	8.12	349	3623	1.19	%	96
9)	Benzene	8.46	364	322899	62.83	%	86
10)	*1,4-Difluorobenzene	9.15	394	177448	100.00	%	100
11)	Trichloroethene	9.79	422	141214	55.82	%	86
12)	*d5-Chlorobenzene	17.77	770	132215	100.00	%	100
13)	Tetrachloroethene	15.07	652	121765	52.61	%	93
14)	Chlorobenzene	17.89	775	261746	56.32	%	95
15)	*d4-1,4-Dichlorobenzene	27.22	1182	72117	100.00	%	100
16)	1,4-Dichlorobenzene	27.35	1188	210497	54.78	%	94

* Compound is ISTD

QUANT REPORT

Operator ID: SARMA
Output File: ^Z621Q::QT
Data File: >B621Q::D6
Name: L5638-1 Spike
Misc: ISSS 50ppb vtclp 100ppb

Quant Rev: 6 Quant Time: 930622 08:34
Injected at: 930621 18:11
Dilution Factor: 1.00000

ID File: VOLSR::D5
Title: SURROGATE RECOVERY FILE
Last Calibration: 930622 08:32

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Pentafluorobenzene	7.22	310	150881	100.00	%	100
2)	Dibromofluoromethane (SS)	7.41	318	3677	3.41	%	100
3)	*Fluorobenzene	8.94	385	128198	100.00	%	100
4)	*1,4-Difluorobenzene	9.15	394	177448	100.00	%	100
5)	d8-Toluene (SS)	12.93	559	150831	106.85	%	98
6)	*d5-Chlorobenzene	17.77	770	132215	100.00	%	100
7)	4-Bromofluorobenzene (SS)	22.47	975	68706	57.82	%	100
8)	*d4-1,4-Dichlorobenzene	27.22	1182	72117	100.00	%	100
9)	d4-1,2-Dichlorobenzene (SS)	28.68	1246	53616	102.89	%	100

* Compound is ISTD

TECHNA CORPORATION
44808 Helm Street
Plymouth, MI 48170

Telephone Numbers:
(313) 454-1100
(313) 454-1233 (FAX)

CHAIN OF CUSTODY - CWASA Washwater

Send report to: Rib Erbs

Project: BASF Wyandotte

Lab/Lab Number: CWASA WASHWATER

Due Date: 6/18/93

Parameters: SEE ATTACHED

Sample ID	Date	Time	Grab	Composite	# Containers	Matrix*
Brown bottles (Large)	6/10/93	3:25pm		X	2	L
White Plastic (Med)	6/10/93	3:27PM		X	2	L
Glass Clear (Small)	6/10/93	3:30PM		X	2	L

Collected by: Kevin Bean	Date: June 10, 1993	Time: 3:30PM
Relinquished by: Kevin Bean	Date: June 10, 1993	Time: 4:05PM
Received by: [illegible]	Date: 6/10/93	Time: 4:05pm
Relinquished by: [illegible]	Date: 6/11/93	Time: 11:35am
Received for Lab by:	Date:	Time:
Relinquished by Lab by:	Date:	Time:
Received by:	Date:	Time:

Remarks:

*Matrix: S=Solid L=Liquid W=Water GW=Groundwater SL=Sludge O=Other

BASF Corporation

BASF

August 6, 1993

Mr. Robert H. Erps
Techna Corporation
44808 Helm Street
Plymouth, MI 48170

Dear Mr. Erps:

Re: CWASA Closure - Wastewater Discharge

As a result of the closure activities, approximately 2,700 gallons of wastewater was generated which required evaluation for disposition. Attached you will find correspondences between BASF and the Wayne County Department of Public Works (DPW) including a copy of the Special Condition Discharge Permit and the analytical report for the subject wastewater.

BASF received verbal approval for discharge from Mr. Walter Syrkowski of the DPW on August 3, 1993. The wastewater was discharged to the DPW on August 5, 1993.

If you have any questions or comments, please call me.

Sincerely,

Adam C. Bickel
Environmental Specialist I

acb
attach.

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

WAYNE COUNTY DEPARTMENT OF PUBLIC SERVICES
DIVISION OF PUBLIC WORKS

EDWARD H. McNAMARA
COUNTY EXECUTIVE

JAMES E. MURRAY
DIRECTOR
(313) 224-3620

INDUSTRIAL PRETREATMENT SECTION
3501 HENRY RUFF ROAD
WESTLAND, MI 48185
(313) 326-7304
FAX: (313) 326-7270

July 13, 1993

BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192
Attn: Mr. Adam Bickel

Dear Adam:

Enclosed is the signed, Final Special Condition Discharge Authorization Permit for the clean closure project. It is effective immediately. FAX analytical results to Mr. Walter S. Syrkowski as soon as possible, for a determination concerning authorization for discharge. FAX No. (313) 326-7270.

If you have any questions, feel free to call Mr. Dan Helm, Mr. Walter Syrkowski, or me at (313) 326-7304.

Very truly yours,

WAYNE COUNTY DIVISION OF PUBLIC WORKS

Terrance A. Galloway (DH)

Terrance A. Galloway, P.E.

Engineer of Industrial Pretreatment

TAG/DRH/sv

c: Charles Anderson, BASF
Mr. Greg Mayhew, City of Wyandotte, Eng. Dept.
Otis Walker - WCDPW, Lab.
File

WAYNE COUNTY DEPARTMENT OF PUBLIC SERVICES
DIVISION OF PUBLIC WORKS
3501 HENRY RUFF ROAD
WESTLAND, MI 48185

INDUSTRIAL PRETREATMENT PROGRAM
SPECIAL CONDITION DISCHARGE AUTHORIZATION

Authorization No.: S-11305 8/4/93
3 wks. Expiration Date: 07-30-93
Effective Date: ~~07-12-93~~ 7/13/93

In accordance with the provisions of Article V, Section 4.07 of the Wayne County Sewer Use Ordinance and pursuant to the requirements of the Industrial Pretreatment Program as specified in 40 CFR 403.8 (f),

BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Contact Person(s):

Adam Bickel Phone No. (313) 246-6836

is hereby authorized to discharge wash and rinse water from storage area clean closure activity from the above identified facility and through the outfalls identified herein into the sanitary sewer system tributary to the Wyandotte Wastewater Treatment Plant in accordance with the conditions set forth in this permit. Compliance with this authorization does not relieve the permittee of its obligation to comply with any or all applicable Pretreatment regulations, standards, or requirements under local, State, and Federal laws, including any such regulations, standards, requirements, or laws that may become effective during the term of this authorization.

Noncompliance with any term or condition of this authorization shall constitute a violation of the Wayne County Sewer Use Ordinance.

Authorization: Wayne County Division of Public Works

Signature of Official: Terrance A. Galloway (BI)

Title: Engineer of Industrial Pretreatment

Date: July 13, 1993

A. DISCHARGE LIMITATIONS

1. Type of Wastewater and Volume

The permittee is authorized to discharge wash water and rinse waters from high pressure cleaning activities from former hazardous waste accumulation storage area. Wash water contained a detergent. Approximate volume of wastewater is 2,700 gallons.

2. Summary Table

a. Effluent Limits - per Wayne County Sewer Use Ordinance

Effluent Characteristic	Discharge Limitations mg/liter Daily Maximum	Self Monitoring Requirements Measurement Frequency	Sample Type	Sampling Point
1,1,1-Trichloroethane	Monitor only	One	Grab	Tank truck-front & rear
1,1,2-Trichloroethane	Monitor only	One	Grab	Tank truck-front & rear
Acrylonitrile	Monitor only	One	Grab	Tank truck-front & rear
Benzene	0.25	One	Grab	Tank truck-front & rear
Cadmium (Total)	1.2	One	Grab	Tank truck-front & rear
Chlorobenzene	Monitor only	One	Grab	Tank truck-front & rear
Chloroform	0.25	One	Grab	Tank truck-front & rear
Chromium (Total)	15.0	One	Grab	Tank truck-front & rear
Cyanide (Total)	2.0	One	Grab	Tank truck-front & rear
Dichlorobenzene	Monitor only	One	Grab	Tank truck-front & rear
Ethylbenzene	0.50	One	Grab	Tank truck-front & rear
Methyl Chloride	Monitor only	One	Grab	Tank truck-front & rear
Methylene Chloride	0.25	One	Grab	Tank truck-front & rear
o-Dichlorobenzene	Monitor only	One	Grab	Tank truck-front & rear

Effluent Characteristic	Discharge Limitations mg/liter Daily Maximum	Self Monitoring Requirements Measurement Frequency	Sample Type	Sampling Point
PCB	0.0002	One	Grab	Tank truck-front & rear
Phenolics (Total)	0.5	One	Grab	Tank truck-front & rear
Selenium	Monitor only	One	Grab	Tank truck-front & rear
Silver (Total)	2.0	One	Grab	Tank truck-front & rear
Tetrachloroethylene	0.25	One	Grab	Tank truck-front & rear
Toluene	1.0	One	Grab	Tank truck-front & rear
Trichloroethylene	1.0	One	Grab	Tank truck-front & rear

3. Special Conditions

   a) Discharge intervals shall be limited to between 8:30 a.m. and 3:30 p.m.

   b) Discharge shall be to a sanitary manhole designated by Greg Mayhew of the City of Wyandotte Engineering Department, phone (313) 246-4450.

   c) Permittee shall be permitted to discharge said water only during dry weather. When the influent flow rate at the Wyandotte WWTP exceeds 100 MGD, permittee will be directed to cease discharging and will be notified when discharging may resume.

   d) Authorization is limited to this water source. Discharge of any additional water or wastewater from the site is prohibited.

B. **MONITORING**

1. Sampling from above the tank truck, the permittee shall take a self-monitoring grab sample from the front and from the rear section of the truck and composite together. Analytical results required prior to discharge to sanitary sewer system.

2. Permittee shall FAX or mail analytical results to Mr. Walter S. Syrkowski, Department Manager, WCDPW-IPP Section, 3501 Henry Ruff Road, Westland, MI 48185, FAX no. 326-7270. All parameters listed in Section A.2.a above must be analyzed. Authorization request: Mr. Syrkowski, phone (313) 326-6340.

C. REPORTING

1. Permittee shall measure volume discharge either by using a flow measuring device or by manually measuring the volume of liquid in the tank truck.

2. Within 30 days of completion of discharge, permittee shall submit the total volume discharged to the City of Wyandotte Public Works, 3131 Biddle Avenue, Wyandotte, MI 48192, Attn: Mark Kowalewski, for sewage disposal billing.

D. FEES

1. Permittee shall pay the City of Wyandotte all applicable wastewater disposal charges based on actual volume discharged.

2. Permittee shall pay an administrative fee of $200.00 to the Wayne County Division of Public Works (WCDPW).

E. TERMS AND CONDITIONS

1. Nontransferability of Authorization

   Special Condition Discharge Authorizations are issued to a specific user for a specific operation and may not be assigned or transferred to another discharger or to another location without the prior written approval of the County.

2. Penalties for Violation of Authorization Conditions

   The Wayne County Sewer Use Ordinance (WCSUO), provides that any person who violates a permit condition is subject to a civil penalty of not more than $500.00, plus actual damages incurred by the POTW per violation per day for as long as the violation continues.

   A person who willfully or negligently violates permit conditions is subject to criminal penalties, as per the WCSUO, Article V, Section 6.10.3 and may be punished by a fine of not more than $500.00, or by imprisonment in the Wayne County Jail for not more than ninety (90) days or both.

TELEFAX

DATE: July 30, 1993

NUMBER OF PAGES: 1
(including cover sheet)

FROM BASF CORPORATION, WYANDOTTE, MICHIGAN

TO: Walter Syrkowski

ORGANIZATION: Wayne County Department of Public Works (DPW)

LOCATION: 3501 Henry Ruff Rd., Westland, MI 48185

PHONE NUMBER: 326-6340 FAX NUMBER: 326-7270

FROM: Charlie Anderson

DEPARTMENT: Site Ecology Services

PHONE NUMBER: 246-5131 FAX NUMBER: 246-6775

HARD COPY TO FOLLOW IN MAIL? No.

SUBJECT: Special Condition Discharge Authorization Number S-11305

As required by the permit, analytical results are summarized below. They show no violations of discharge limitations. Please inform me whether BASF may discharge to the POTW sewer.

Parameter	Discharge Limit (ppm)	Result (ppm)
1,1,1-trichloroethane		<MDL
1,1,2-trichloroethane		<MDL
acrylonitrile		<MDL
benzene	0.25	0.01
cadmium (total)	1.2	0.02
chlorobenzene		<MDL
chloroform	0.25	<MDL
chromium (total)	15.0	<MDL
cyanide (total)	2.0	<MDL
dichlorobenzene		<MDL
ethylbenzene	0.5	<MDL

Parameter	Discharge Limit (ppm)	Result (ppm)
methyl chloride		<MDL
methylene chloride	0.25	<MDL
o-dichlorobenzene		<MDL
PCB	0.0002	<MDL
phenolics (total)	0.5	0.47
selenium		<MDL
silver (total)	2.0	<MDL
tetrachloroethylene	0.25	<MDL
toluene	1.0	0.005
trichloroethylene	1.0	<MDL

bc: ACBickel
CDLaScola
DPThiel

SHRADER
Analytical and Consulting
LABORATORIES INC.

REPORT OF ANALYTICAL SERVICES

SUBMITTED TO:

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MICHIGAN 48192

ATTN: MR. C. E. ANDERSON

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

Customer sample	:	OLD WHSE. CLEAN OUT
Sample description	:	WATER COLLECTED ON 07/23/93
Project #	:	C227
Analysis performed	:	GC/MS, AA & STANDARD METHODS
Date received	:	July 23, 1993
Date completed	:	July 28, 1993
Report date	:	July 28, 1993

Approved ________________ G. Sudhakar Reddy, Ph.D.

Analyst ________________ Mark Lapensee

Analyst ________________ Marty L. Robbins

Enclosure(s)

- Continued -

ANALYTICAL PROCEDURE:

The water sample labelled OLD WHSE. CLEAN OUT (SL #C22701) was analyzed for volatile organic parameters according to EPA Method 624; for polychlorinated biphenyls (PCBs) by gas chromatography/mass spectrometry using multiple ion monitoring, for phenols and cyanide using Standard Methods and for metals by atomic absorption spectroscopy.

RESULTS:

Quantitation summaries for volatiles and PCBs are enclosed.

Other results are as follows:

PARAMETER	RESULT	D.L.[1]	UNITS
Phenols	.470	.01	mg/L
Cyanide	N.D.[2]	0.02	mg/L
Cadmium	0.02	0.01	mg/L
Chromium	N.D.	0.02	mg/L
Selenium	N.D.	0.005	mg/L
Silver	N.D.	0.002	mg/L

[1]D.L. = Detection Limit
[2]N.D. = Not Detected

MLR MX

MLS/rac

SHRADER LABORATORIES, INC.

Report date : 07-27-1993 SPIKE RECOVERY REPORT

Data file : C22701A.QMM Amount extracted : 750 ml

Description : OLD WHSE.CLEAN OUT

Sample submitted by : BASF-WYANDOTTE

Analyzed on 07-27-1993 by ROBG - Report prepared by LAPM

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
BIPHENYL-D10	59	107	55.1% 2
TETRACHLORO-M-XYLENE	44	107	41.1% 3
DIBUTYLCHLORENDATE	52	107	48.6% 2

SHRADER LABORATORIES, INC.

Report date : 07-27-1993

QUANTITATION SUMMARY

Data file : C22701A.QMM

Amount extracted : 750 ml

Description : OLD WHSE.CLEAN OUT

Sample submitted by : BASF-WYANDOTTE

Analyzed on 07-27-1993 by ROBG

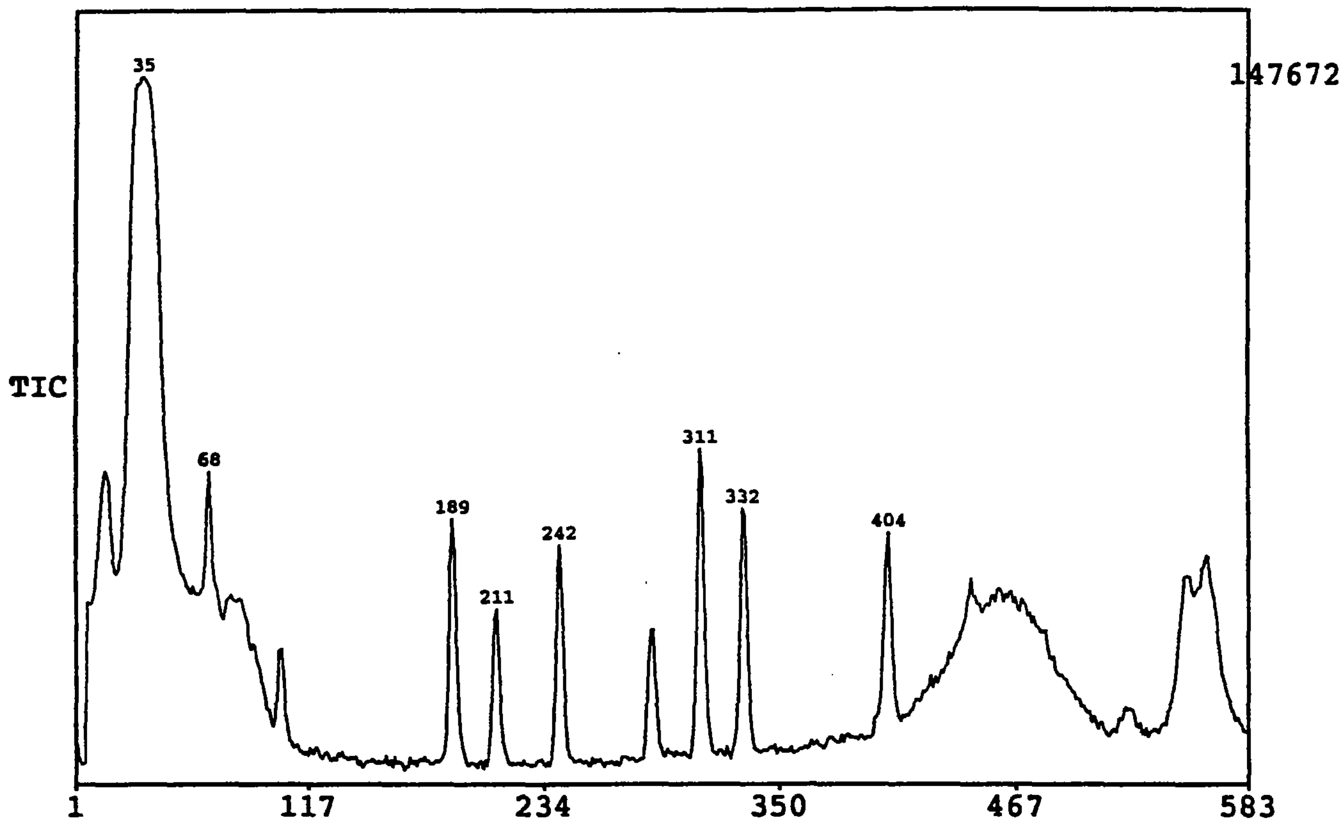
Report prepared by LAPM

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
Arochlor-1016 A	N.D.	0.3
Arochlor-1016 B	N.D.	0.4
Arochlor-1016 C	N.D.	0.4
Arochlor-1221 A	N.D.	0.4
Arochlor-1221 B	N.D.	0.2
Arochlor-1221 C	N.D.	0.2
Arochlor-1232 A	N.D.	0.3
Arochlor-1232 B	N.D.	0.4
Arochlor-1232 C	N.D.	0.8
Arochlor-1242 A	N.D.	0.4
Arochlor-1242 B	N.D.	0.4
Arochlor-1242 C	N.D.	0.3
Arochlor-1248 A	N.D.	0.7
Arochlor-1248 B	N.D.	0.2
Arochlor-1248 C	N.D.	0.5
Arochlor-1254 A	N.D.	0.9
Arochlor-1254 B	N.D.	1
Arochlor-1254 C	N.D.	0.3
Arochlor-1260 A	N.D.	1
Arochlor-1260 B	N.D.	0.2
Arochlor-1260 C	N.D.	1

N.D. = Not detected

SHRADER LABORATORIES, INC.
07-23-1993

C22701B OLD WHSE. CLEAN OUT 7/23/93
Date run : 07-23-1993(14:35:28) Instr. : M4* Operator : CALJ



SHRADER LABORATORIES, INC.
Report date : 07-23-1993 SPIKE RECOVERY REPORT

DATA file : C22701B Sample size : 44 ml
Description : OLD WHSE. CLEAN OUT 7/23/93
Sample submitted by : BASF CORPORATION
Analyzed on 07-23-1993 by CALJ Report prepared by ROBM

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
1,2-DICHL'ETHANE-D4	100	90.9	110.0% 3
BENZENE-D6	90	90.9	99.0% 1
1,4-DICHLOROBUTANE	110	90.9	121.0% 2
TOLUENE-D8	90	90.9	99.0% 1

SHRADER LABORATORIES, INC.

Report date : 07-23-1993 QUANTITATION SUMMARY

DATA file : C22701B Sample size : 44 ml

Description : OLD WHSE. CLEAN OUT 7/23/93

Sample submitted by : BASF CORPORATION

Analyzed on 07-23-1993 by CALJ Report prepared by ROBM

COMPOUND	CONCENTRATION Micrograms/Liter		Det.Limit
ACRYLONITRILE	N.D.		4
BENZENE		10	0.6
CHLOROBENZENE	N.D.		0.6
CHLOROFORM	N.D.		0.9
CHLOROMETHANE	N.D.		1
DICHLOROBENZENES	N.D.		1.0
ETHYL BENZENE	N.D.		1.0
METHYLENE CHLORIDE	N.D.		5
TETRACHLOROETHENE	N.D.		1
TOLUENE		4.9	0.6
1,1,1-TRICHLO'ETHANE	N.D.		2
1,1,2-TRICHLO'ETHANE	N.D.		1
TRICHLOROETHENE	N.D.		1

N.D. = Not detected TOTAL 14.9

SHRADER LABORATORIES, INC.

Report date : 07-27-1993

SPIKE RECOVERY REPORT

Data file : BK0726A.QMM

Amount extracted : 750 ml

Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 07-27-1993 by ROBG

Report prepared by LAPM

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
BIPHENYL-D10	99	107	92.5% 1
TETRACHLORO-M-XYLENE	63	107	58.9% 2
DIBUTYLCHLORENDATE	60	107	56.1% 2

SHRADER LABORATORIES, INC.

Report date : 07-27-1993 QUANTITATION SUMMARY

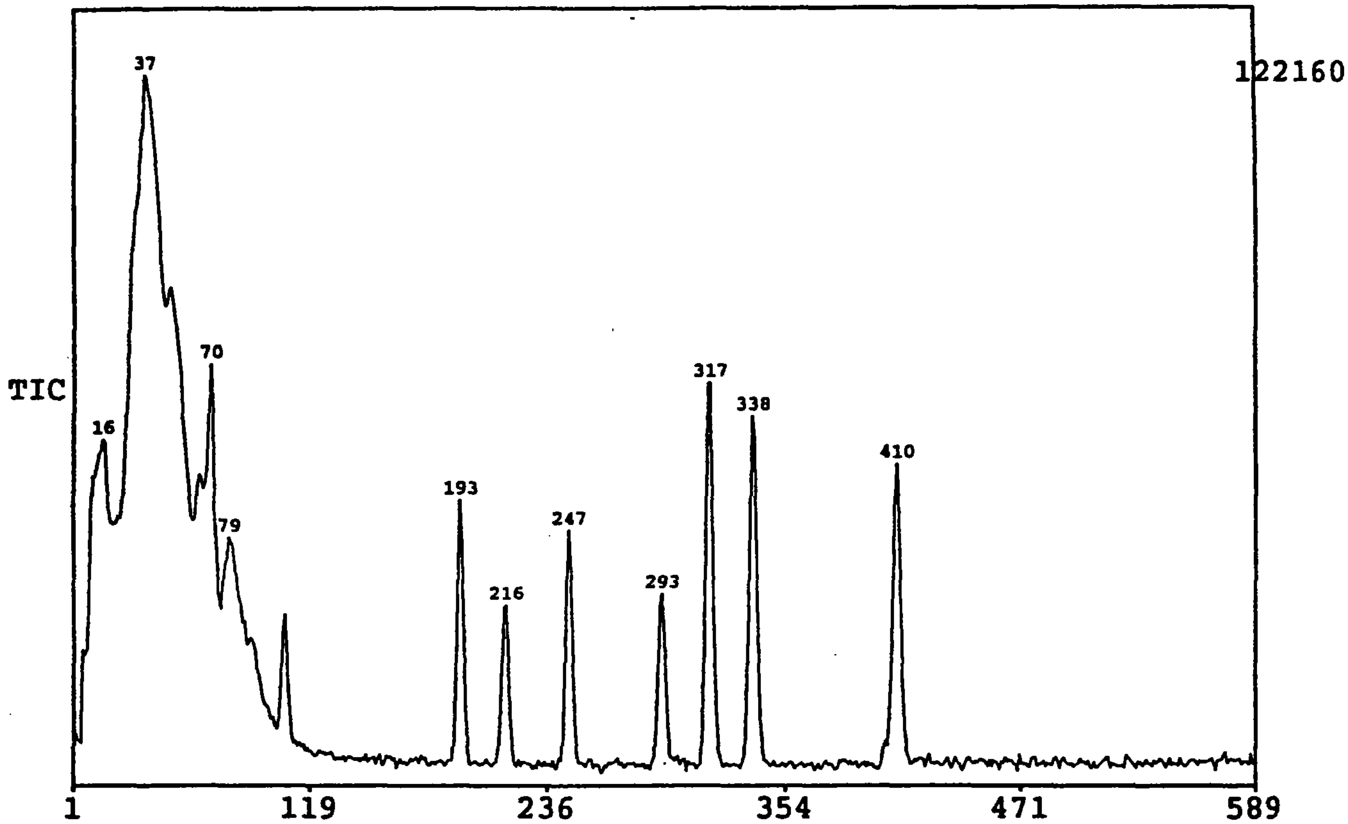
Data file : BK0726A.QMM Amount extracted : 750 ml
Description : QA/QC BLANK
Sample submitted by : QA/QC
Analyzed on 07-27-1993 by ROBG Report prepared by LAPM

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
Arochlor-1016 A	N.D.	0.07
Arochlor-1016 B	N.D.	0.04
Arochlor-1016 C	N.D.	0.2
Arochlor-1221 A	N.D.	0.2
Arochlor-1221 B	N.D.	0.02
Arochlor-1221 C	N.D.	0.04
Arochlor-1232 A	N.D.	0.04
Arochlor-1232 B	N.D.	0.07
Arochlor-1232 C	N.D.	0.1
Arochlor-1242 A	N.D.	0.08
Arochlor-1242 B	N.D.	0.05
Arochlor-1242 C	N.D.	0.2
Arochlor-1248 A	N.D.	0.07
Arochlor-1248 B	N.D.	0.07
Arochlor-1248 C	N.D.	0.5
Arochlor-1254 A	N.D.	0.7
Arochlor-1254 B	N.D.	0.1
Arochlor-1254 C	N.D.	0.5
Arochlor-1260 A	N.D.	0.8
Arochlor-1260 B	N.D.	0.2
Arochlor-1260 C	N.D.	0.6

N.D. = Not detected

SHRADER LABORATORIES, INC.
07-23-1993

BLK723V   LABORATORY BLANK
Date run : 07-23-1993(09:40:00)   Instr. : M4*   Operator : CALJ



SHRADER LABORATORIES, INC.
Report date : 07-23-1993   SPIKE RECOVERY REPORT

DATA file : BLK723V   Sample size : 44 ml
Description : LABORATORY BLANK
Sample submitted by : QA\QC
Analyzed on 07-23-1993 by CALJ   Report prepared by ROBM

COMPOUND	CONCENTRATION Micrograms/Liter	SPIKE	Percent Recovery
1,2-DICHL'ETHANE-D4	87	90.9	95.7% 2
BENZENE-D6	97	90.9	106.7% 1
1,4-DICHLOROBUTANE	90	90.9	99.0% 1
TOLUENE-D8	83	90.9	91.3% 2

SHRADER LABORATORIES, INC.

Report date : 07-23-1993

QUANTITATION SUMMARY

DATA file : BLK723V

Sample size : 44 ml

Description : LABORATORY BLANK

Sample submitted by : QA\QC

Analyzed on 07-23-1993 by CALJ

Report prepared by ROBM

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
ACRYLONITRILE	N.D.	3
BENZENE	N.D.	0.7
CHLOROBENZENE	N.D.	0.6
CHLOROFORM	N.D.	0.8
CHLOROMETHANE	N.D.	1
DICHLOROBENZENES	N.D.	1.0
ETHYL BENZENE	N.D.	0.9
METHYLENE CHLORIDE	N.D.	5
TETRACHLOROETHENE	N.D.	1
TOLUENE	N.D.	0.6
1,1,1-TRICHLO'ETHANE	N.D.	1
1,1,2-TRICHLO'ETHANE	N.D.	2
TRICHLOROETHENE	N.D.	2

N.D. = Not detected TOTAL 0

bc: ACBickel
CDLaScola
DPThiel

TELEFAX

DATE: June 15, 1993

NUMBER OF PAGES: 6
(including cover sheet)

FROM BASF CORPORATION, WYANDOTTE, MICHIGAN

TO: Dan Helm

ORGANIZATION: Wayne County Department of Public Works (DPW)

LOCATION: 3501 Henry Ruff Rd., Westland, MI 48185

PHONE NUMBER: 326-6630 FAX NUMBER: 326-7270

FROM: Charlie Anderson

DEPARTMENT: Site Ecology Services

PHONE NUMBER: 246-5131 FAX NUMBER: 246-6775

HARD COPY TO FOLLOW IN MAIL? No.

SUBJECT: Special Conditions Permit Request - Clean Closure of Former <90-Day Storage Area

We would like to obtain a special conditions permit from the DPW to allow us to discharge wastewaters generated during the clean closure of BASF's former Central Waste Accumulation Storage Area (CWASA). Attached please find the following items:

- list of hazardous components for significant materials which were accumulated at the former CWASA
- page 1 from the MSDS for the cleaning agent - Non-Butyl Degreaser #502-GX
- a summary of the composition for Non-Butyl Degreaser #502-GX
- completed initial review form which describes the wastewater in question.

Background The CWASA was used for the accumulation of nonhazardous and hazardous waste containers for less than 90 days prior to transportation to an off-site TSD facility. The waste accumulated in this area have included a variety of materials from industrial processes, laboratory activities, research and development

Pollutant	Priority Pollutant	Critical Material	POTW Limit
1,1,1-Trichloroethane	Y	N	5,000 ppb
1,1,2-Trichloroethane	Y	Y	
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	N	
2-Ethoxyethanol	N	N	
2-Nitropropane	N	Y	
2-Propen-1-ol	N	N	
Acetone	N	N	
Acrylamide	N	N	
Acrylonitrile	Y	Y	
Benzene	Y	Y	250 ppb
Cadmium	Y	Y	1.2 ppm
Carbon Disulfide	N	N	
Chlorobenzene	Y	Y	
Chloroform	N	Y	250 ppb
Chromium	Y	Y	15 ppm
Cyanide	Y	Y	2 ppm
Cyclohexanone	N	N	
Dichlorobenzene	Y	Y	
Diethylhexylphthalate	N	Y	
Ethyl Acetate	N	N	
Ethyl Ether	N	N	
Ethylbenzene	Y	Y	500 ppb
Isobutanol	N	N	
Maleic Acid	N	N	
Methanol	N	N	
Methyl Isobutyl Ketone	N	N	
Methylene Bisphenyl Isocyanate	N	N	
Methylene Chloride	Y	Y	250 ppb
n-Butyl Alcohol	N	N	
o-Dichlorobenzene	Y	Y	
PCB	Y	Y	0.2 ppb
Phenol	Y	N	1,000 ppb
Phosphoridithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester (Disulfoton)	N	Y	
Pyridine	N	N	
Selenium	Y	Y	
Silver	Y	Y	2 ppm
Strychnidin-10-one, 2,3-dimethoxy (Brucine)	N	N	
Styrene	N	Y	
Tetrachloroethylene	Y	Y	250 ppb
Toluene	Y	Y	1,000 ppb
Toluene Diisocyanate	N	N	
Toluenediamine	N	Y	
Trichloroethylene	Y	Y	1,000 ppb
Trichlorofluoromethane	N	N	
Xylene	N	Y	125 ppb

6/9/93

ALL-CHEM CORPORATION 865-3600

BRUCE BAKER

#502-GX

INGREDIENTS	% Wt
POTASSIUM HYDROXIDE	10
DIPROPYLENE GLYCOL METHYLETHER	10
SODIUM SILICATE	5
ETHOXYLATED NONYLPHENOL SURFACTANT	5
DYE	TRACE
FRAGRANCE	TRACE
WATER	BALANCE (~70)

TANK TRUCK COMPOSITION:

~3000 gal TOTAL WATER & ~~[illegible]~~ DEGREASER
55 gal #502-GX

June 24, 1993

Mr. Robert H. Erps
Techna Corporation
44808 Helm Street
Plymouth, MI 48170

Dear Mr. Erps:

Re: CWASA Closure - Analytical Report

This letter is in response to the results of the June 21 analytical report of the final rinsate associated with the CWASA closure activities. The parameters of concern identified in the report included chloroform, bromodichloromethane, and bis(2-ethylhexyl)phthalate. These parameters were present at levels of 7.6 ug/l, 2 ug/l, and 72 ug/l respectively.

It is BASF's contention that these parameters are present as a result of non-waste reasons. The chloroform and bromodichloromethane are present in the city water supply at levels greater than those found in the final rinsate (see attached memo dated June 24 from David Sidlar).

The bis(2-ethylhexyl)phthalate is a common plasticizer that could be present as a result of the floor coating, cleaning procedures, sampling procedures, and/or analytical procedures. The bis(2-ethylhexyl)phthalate was accumulated at the CWASA between 1988 and 1991 as a waste stream, BASF Waste Code W125. The waste was generated in relatively low volumes 22x55-gallon drums in 1988, 18x55-gallon drums in 1989, 5x55-gallon drums in 1990, and 1x55-gallon drums in 1991. Review of the CWASA weekly inspection logs did not indicate a spill incident associated with this waste stream.

Based on the reasons stated above, it is BASF's contention that the chloroform, bromodichloromethane, and bis(2-ethylhexyl)phthalate parameters are present as a result of non-waste reasons.

If you have any questions or comments, please call me.

Sincerely,

Adam C. Bickel
Environmental Specialist I

acb
attach.

cc: CDLaScola

Interoffice **BASF**

Date	June 24, 1993
To	A. Bickel
From/Location	D. Sidlar
Subject	Water Survey Results
Copies	CLaScola

In February of this year a water quality survey was performed. Samples were taken at 11 different locations to cover all of the city water supply. VOC analysis was performed using EPA Method 524.2. Two compounds were common to all of the samples of city water. The compounds are bromodichloromethane and chloroform. The averages from the 11 samples are listed below.

bromodichloromethane	9.0 ug/L
chloroform	21 ug/L

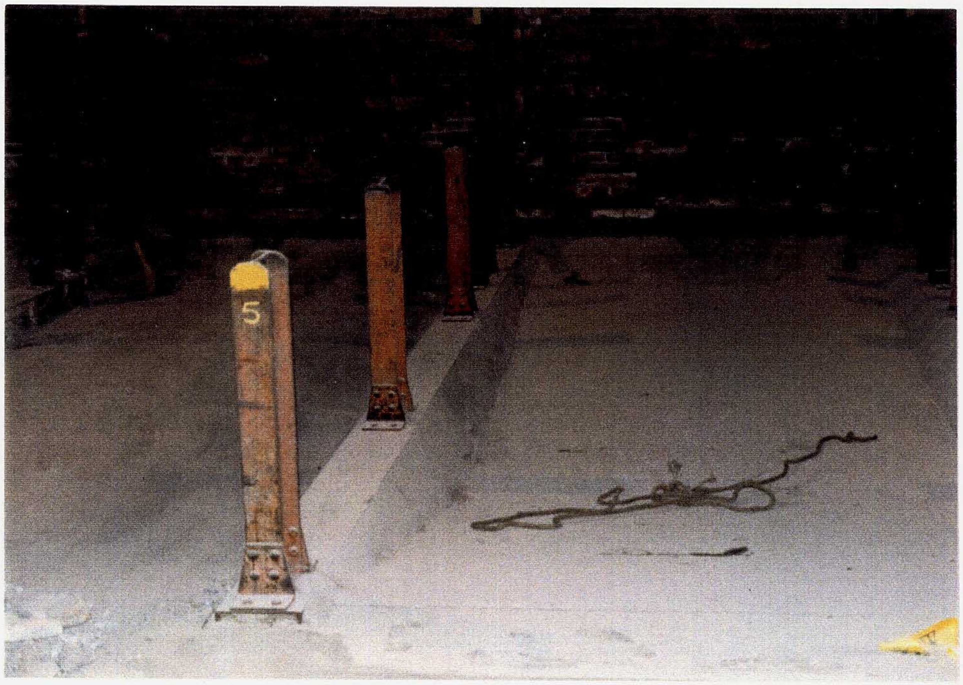
If you have any questions please call.

David Sidlar

APPENDIX C

EXHIBIT 2

CLOSURE OF CENTRAL WASTE ACCUMULATION STORAGE AREA (SWMU C), 1993



CLOSURE OF CENTRAL WASTE ACCUMULATION STORAGE AREA (SWMU C), 1993

APPENDIX D

BARRY,   4/7/94
TPU EXCAVATION
ANALYTICAL DATA.
(SWMU F)   ADAM

11/30/90

MET WITH D. ZALESKI AND ANAND HUPRIKAR TO OBTAIN REPRESENTATIVE SAMPLES OF THE EXCAVATED MATERIAL ASSOCIATED WITH THE TPU SYN. PLANT SANITARY SEWER AND THE FIRE WATER SUPPLY (FROM THE TIO POND).

THREE SAMPLES WERE TAKEN:

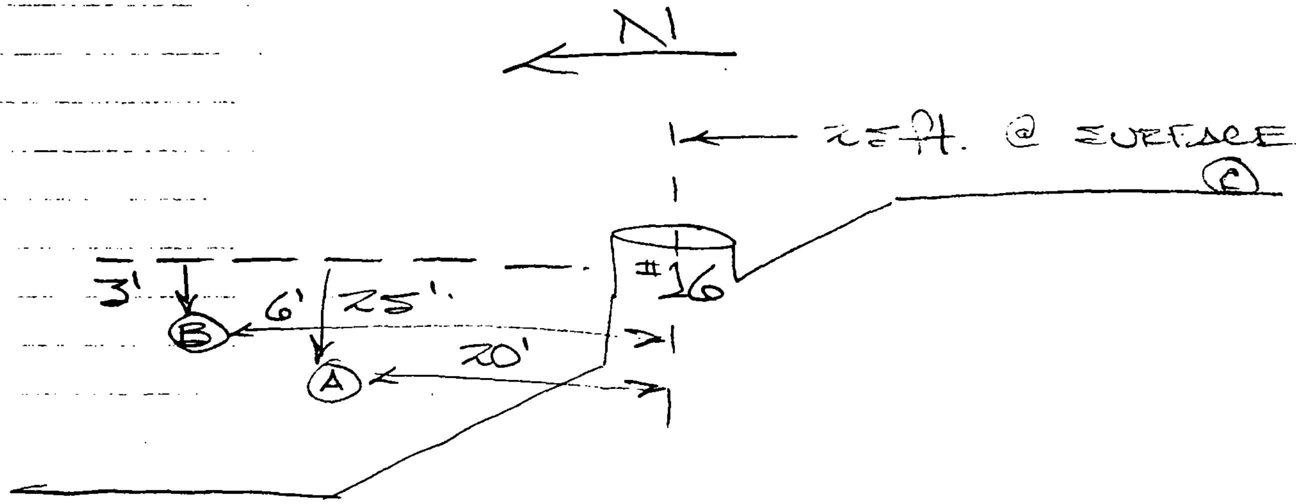
(A) KILN WASTE (NOT DBO) SOLID LIME WHITE MATERIAL, A LAYER 6-9' WAS OBSERVED BEGINNING 5-6' BELOW GRADE

(B) BRITESORB FILTER CAKE WHITE/TAN SOLIDS W/ FILTER PAPER, OBSERVED ~3' BELOW GRADE ABOVE THE KILN WASTE.

(C) SURFACE MATERIAL FROM BACKFILL (PRIOR TOPSOIL) OF EXCAVATION. SOIL/CLAY/KILN &/OR BRITESORB PRESENT.

SAMPLES WERE TAKEN N & S of

TPU SYN. MANHOLE #16.



KILN WASTE AND BLITESORB FILTER CAKE LAYERING VARIED AS EXCAVATION LOCATION CHANGED FROM S to N.

NEED TO OBTAIN A BETTER HISTORICAL INFORMATION REGARDING THE KILN WASTE (CONTACT F. MANOR)

MH16A ✓

Analytic & Biological Laboratories, Inc.

4350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

(313) 477-6666
FAX (313) 477-4604

January 8, 1990

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192
ATTN: ADAM BICKEL

Dear Mr. Bickel,

Thank you for providing Analytic & Biological Laboratories the opportunity to serve your laboratory needs. The samples you submitted have been analyzed as requested. The laboratory results are compiled in the enclosed report.

If you have any questions regarding the results, or if we may be of further assistance to you, please call me at the published telephone number.

Yours very truly,

Francis B. McLaughlin, FAIC
Director of Laboratories

FBM/vm

Analytic & Biological Laboratories, Inc.

1550 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

CERTIFICATIONS

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49881

SAMPLE DESCRIPTION: MH16A

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

TCLP

Organics

Volatiles ✓

Level of Detection
See Attached

Benzene
N.D.

Carbon Tetrachloride
N.D.

Chlorobenzene
N.D.

Chloroform
N.D.

1,4 Dichlorobenzene
N.D.

1,2 Dichloroethane
N.D.

1,1 Dichloroethylene
N.D.

2-Butanone (M.E.K.)
N.D.

Pyridine
N.D.

Tetrachloroethylene
N.D.

Analytic & Biological
Laboratories, Inc.

1350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49881

SAMPLE DESCRIPTION: MH16A

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Trichloroethylene
N.D.
Vinyl Chloride
N.D.
Semivolatiles ✓

Level of Detection
See Attached
Cresol
N.D.
2 Methylphenol (o-Cresol)
N.D.
3 Methylphenol (m-Cresol)
N.D.
4 Methylphenol (p-Cresol)
N.D.
Pentachlorophenol
N.D.
2,4,5 Trichlorophenol
N.D.
2,4,6 Trichlorophenol
N.D.
2.4 Dinitroltoluene
N.D.
Hexachlorobenzene
N.D.
Hexachlorobutadiene
N.D.

CERTIFICATIONS

CREDENTIALS

Analytic & Biological Laboratories, Inc.

[illegible] CIRCLE
[illegible] HILLS, MICHIGAN 48335

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49881

SAMPLE DESCRIPTION: MH16A

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Hexachloroethane		
	N.D.	
Nitrobenzene		
	N.D.	
Metals		
	.	
Arsenic		
	<0.053	mg/l
Barium		
	0.050	mg/l
Cadmium		
	<0.003	mg/l
Chromium		
	0.011	mg/l
Copper		
	0.051	mg/l
Lead		
	<0.042	mg/l
Mercury		
	<0.020	mg/l
Selenium		
	<0.075	mg/l
Silver		
	<0.050	mg/l
Zinc		
	0.057	mg/l
pH		
	10.43	units

Analytic & Biological
Laboratories, Inc.

[address illegible]
FARMINGTON HILLS, MICHIGAN 48335

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49881

SAMPLE DESCRIPTION: MH16A

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Copper	
0.053	mg/l
Zinc	
0.078	mg/l
Ignitability	
No Flash up to 200 deg.	F
Acid Extraction 24 Hr.	
.	
Reactivity	
No	
Total Cyanide	
<10	ppm
Total Sulfide	
48	ppm

QUANT REPORT

Operator ID: JUDY
Output File: ^A5302::D4
Data File: >A5302::A1
Name: #49881 tclp 100:1
Misc: is=40 ss=100/200

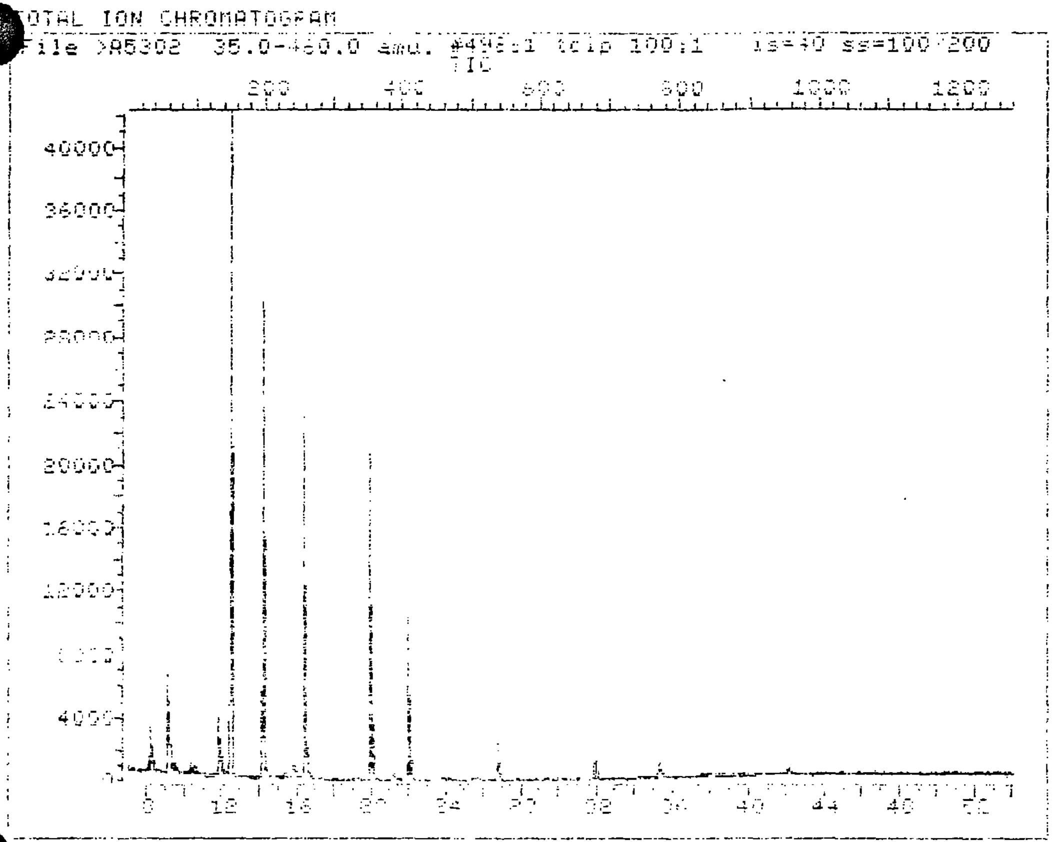
Quant Rev: 6   Quant Time: 901226 18:49
Injected at: 901226 17:54
Dilution Factor: 1.00000

BTL# 2

ID File: BNAIDD::SC
Title: BNAID FILE FOR DAILY USE
Last Calibration: 901226 14:28

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	12.42	148	21988	40.00	NG/UL	75
3)	2-Fluorophenol (Surrogate)	9.03	56	12919	20.72	NG/UL	73
4)	d5-Phenol (Surrogate)	11.83	132	9219	17.37	NG/UL	96
17)	d5-Nitrobenzene (Surrogate)	14.19	196	35006	37.65	NG/UL	85
26)	*d8-Naphthylene	16.32	254	45466	40.00	NG/UL	72
35)	2-Fluorobiphenyl (Surrogate)	19.89	351	23693	47.16	NG/UL	96
41)	*d10-Acenaphthene	21.99	408	9844	40.00	NG/UL	[illegible]
44)	2,4-Dinitrophenol	26.70	536	711	~~55~~.11	NG/UL	100
58)	*d10-Phenanthrene	26.70	536	5745	40.00	NG/UL	82
63)	Benzidine	26.70	536	711	~~67~~.79	NG/UL	78
65)	d14-p-Terphenyl (Surrogate)	31.92	678	5641	34.03	NG/UL	74
68)	*d12-Chrysene	35.31	770	2380	40.00	NG/UL	92
[illegible])	*d12-Perylene	42.12	955	2286	40.00	NG/UL	99

* Compound is ISTD



Data File: >A5302::A1 Quant Output File: ^A5302::D4
Name: #49881 tclp 100:1
Misc: is=40 ss=100/200 BTL# 2

Id File: BNAIDD::SC
Title: BNAID FILE FOR DAILY USE
Last Calibration: 901226 14:28

Operator ID: JUDY
Quant Time: 901226 18:49
Injected at: 901226 17:54

QUANT REPORT

Operator ID: JIM
Output File: ^B6997::D4
Data File: >B6997::D1
Name: 49881 BASF
Misc: 5.00ML ISSS 50PPB

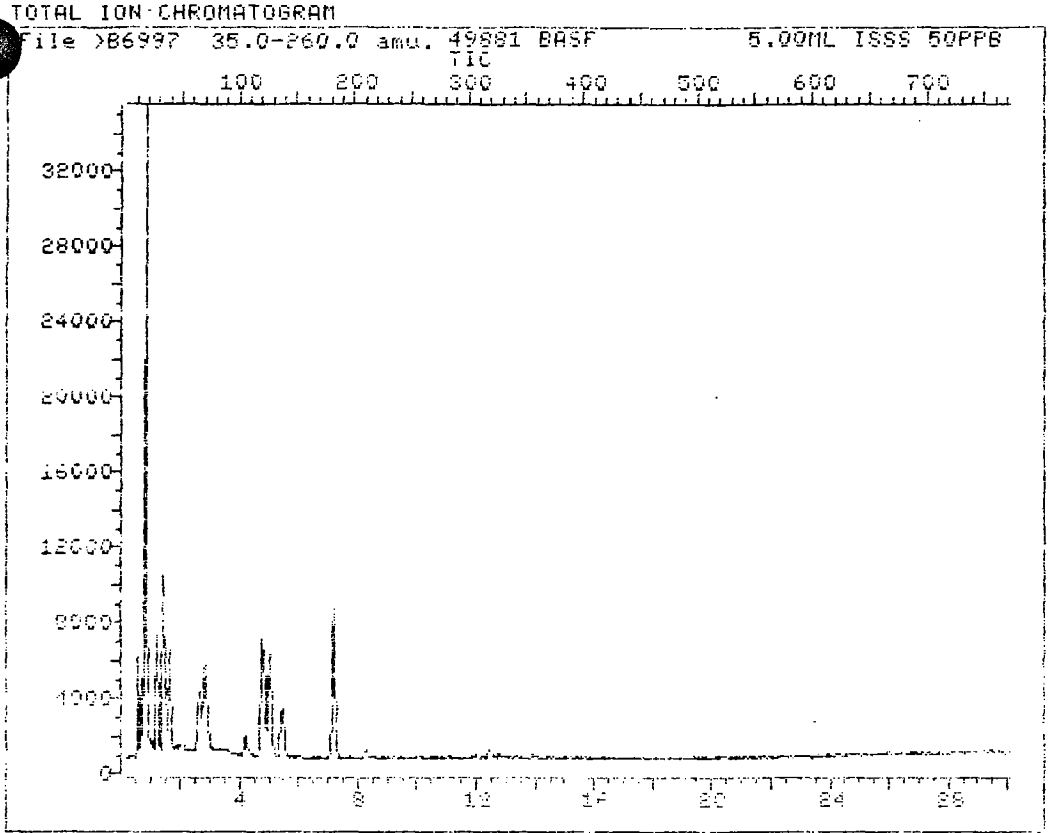
Quant Rev: 6
Quant Time: 901219 07:40
Injected at: 901219 04:33
Dilution Factor: 1.00000

ID File: TCLPVC::SC
Title: TCLP VOLATILE ORGANICS
Last Calibration: 901219 07:37

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Bromochloromethane	1.17	27	4086	50.00	UG/L	83
3)	Chloroform	1.13	26	3953	19.61	UG/L	90
4)	Dichloromethane	.82	18	22507	107.37	UG/L	84
7)	Benzene	1.44	34	316	~~1.06~~	UG/L	100
9)	d4-1,2-Dichloroethane(SS)	1.40	33	954	35.14	UG/L	100
10)	*1,4-Difluorobenzene	1.60	38	9823	50.00	UG/L	92
14)	D8-Toluene(SS)	2.80	69	11152	57.97	UG/L	99
15)	*d5-Chlorobenzene	5.01	126	12808	50.00	UG/L	99
19)	1,4-Dichlorobenzene	9.24	235	244	.84	UG/L	100

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >B6997::D1 Quant Output File: ^B6997::D4
Name: 49881 BASF
Misc: 5.00ML ISSS 50PPB

Id File: TCLPVC::SC
Title: TCLP VOLATILE ORGANICS
Last Calibration: 901219 07:37

Operator ID: JIM
Quant Time: 901219 07:40
Injected at: 901219 04:33

12-19-90
#49881
BASF

TCLP MATRIX SPIKE REPORT

All results in mg/l unless noted

ANALYTE	Conc. of Spiked Sample (Xs)	Conc. of Unspiked Sample (Xy)	Known Value of Spike (K)	Percent Recovery 100(Xs-Xy)/K	Corrected Sample Value 100(Xy/%R)
Arsenic	5.30	<0.053	5.0	106%	<0.053
Mercury	0.00870	<0.005	0.010	87.0%	<0.020
Selenium	1.13	<0.075	1.00	113%	<0.075
Zinc	5.34	0.060	5.00	106%	0.057
Lead	5.12	<0.042	5.00	102%	<0.042
Cadmium	1.03	<0.003	1.00	103%	<0.003
Chromium	4.93	0.011	5.00	98.4%	0.011
Copper	4.73	0.048	5.00	93.6%	0.051
Silver	5.26	<0.050	5.00	105%	<0.050
Barium	4.67	0.046	5.00	92.5%	0.050

Analytic & Biological
Laboratories, Inc.

4350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

(313) 477-6666
FAX (313) 477-4604

METHOD DETECTION LIMITS FOR TCLP COMPOUNDS (REVISED)

This method covers the detection limits for the TCLP volatile and semi-volatile compounds. The volatile fraction is based on the ZHS extract and the semi-volatile fraction is based on the extraction fluid extracted with methlene chloride. All units are in ppm (mg/kg or mg/l).

Volatile Fraction (ZHS)

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
Benzene	0.1	0.5
Carbon Tetrachloride	0.1	0.5
Chlorobenzene	0.1	100.0
Chloroform	0.1	6.0
1,4-Dichlorobenzene	0.1	7.5
1,2-Dichloroethane	0.1	0.5
1,1-Dichloroethylene	0.1	0.7
2-Butanone (MEK)	0.1	200.0
Pyridine	0.1	5.0
Tetrachloroethylene	0.1	0.7
Trichloroethylene	0.1	0.5
Vinyl Chloride	0.1	0.2

Analytic & Biological
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FAX (313) 477-4604

Semi-Volatile Fraction
Acidic Extract

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
Cresol		200.0
2-Methylphenol (o-Cresol)	1.0	200.0
3-Methylphenol (m-Cresol)	1.0	200.0
4-Methylphenol (p-Cresol)	1.0	200.0
Pentachlorophenol	1.0	100.0
2,4,5-Trichlorophenol	1.0	400.0
2,4,6-Trichlorophenol	1.0	2.0

Base/Neutral Extract

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
2,4-Dinitrotoluene	0.1	0.13
Hexachlorobenzene	0.1	0.1
Hexachloro-1,3-butadiene	0.1	0.5
Hexachloroethane	0.1	3.0
Nitrobenzene	0.1	2.0

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Metals

COMPOUNDS	REGULATORY LIMITS mg/l
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0

Herbicides & Pesticides

COMPOUNDS	LOD mg/l	REGULATORY LIMITS mg/l
Chlordane	0.01	0.03
Endrin	0.01	0.02
2,4,D	0.01	10.0
Lindane	0.01	0.4
Methoxychlor	0.01	10.0
Heptachlor	0.008	0.008
Toxaphene	0.01	0.5
2,4,5 - TP (Silvex)	0.01	1.0

Analytic & Biological
Laboratories, Inc.

4350 INDOPLEX CIRCLE
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(313) 477-6666
FAX (313) 477-4604

MH16B

January 8, 1990

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192
ATTN: ADAM BICKEL

Dear Mr. Bickel,

Thank you for providing Analytic & Biological Laboratories the opportunity to serve your laboratory needs. The samples you submitted have been analyzed as requested. The laboratory results are compiled in the enclosed report.

If you have any questions regarding the results, or if we may be of further assistance to you, please call me at the published telephone number.

Yours very truly,

Francis B. McLaughlin, FAIC
Director of Laboratories

FBM/vm

Analytic & Biological
Laboratories, Inc.

1350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

(313) 477-6666
FAX (313) 477-4604

BASF CORPORATION
1609 BIDDLE AVE.
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49882

SAMPLE DESCRIPTION: MH16B

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

TCLP

.

Organics

.

Volatiles

.

Level of Detection
See Attached
Benzene
N.D.
Carbon Tetrachloride
N.D.
Chlorobenzene
N.D.
Chloroform
N.D.
1,4 Dichlorobenzene
N.D.
1,2 Dichloroethane
N.D.
1,1 Dichloroethylene
N.D.
2-Butanone (M.E.K.)
N.D.
Pyridine
N.D.
Tetrachloroethylene
N.D.

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ADAM BICKEL

SAMPLE NO: 49882

SAMPLE DESCRIPTION: MH16B

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Trichlorocthylenc
N.D.
Vinyl Chloridc
N.D.
Scmivolatilcs

.

Level of Detection
See Attachcd
Cresol
N.D.
2 Methylphenol (o-Cresol)
N.D.
3 Methylphenol (m-Cresol)
N.D.
4 Methylphenol (p-Cresol)
N.D.
Pentachlorophenol
N.D.
2,4,5 Trichlorophenol
N.D.
2,4,6 Trichlorophenol
N.D.
2,4 Dinitroltoluene
N.D.
Hexachlorobenzene
N.D.
Hexachlorobutadiene
N.D.

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BASF CORPORATION
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ADAM BICKEL

SAMPLE NO: 49882

SAMPLE DESCRIPTION: MH16B

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Hexachloroethane	
N.D.	
Nitrobenzene	
N.D.	
Metals	
Arsenic	
<0.053	mg/l
Barium	
0.003	mg/l
Cadmium	
<0.003	mg/l
Chromium	
<0.007	mg/l
Copper	
0.021	mg/l
Lead	
<0.042	mg/l
Mercury	
<0.020	mg/l
Selenium	
<0.075	mg/l
Silver	
<0.050	mg/l
Zinc	
0.066	mg/l
pH	
10.68	units

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BASF CORPORATION
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WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49882

SAMPLE DESCRIPTION: MH16B

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Copper	
0.048 ✓	mg/l
Zinc	
0.114 ✓	mg/l
Ignitability	
No Flash up to 200 deg. ✓	F
Acid Extraction 24 Hr.	
Reactivity	
No	
Total Cyanide ✓	
<10	ppm
Total Sulfide ✓	
65	ppm

CERTIFICATIONS

QUANT REPORT

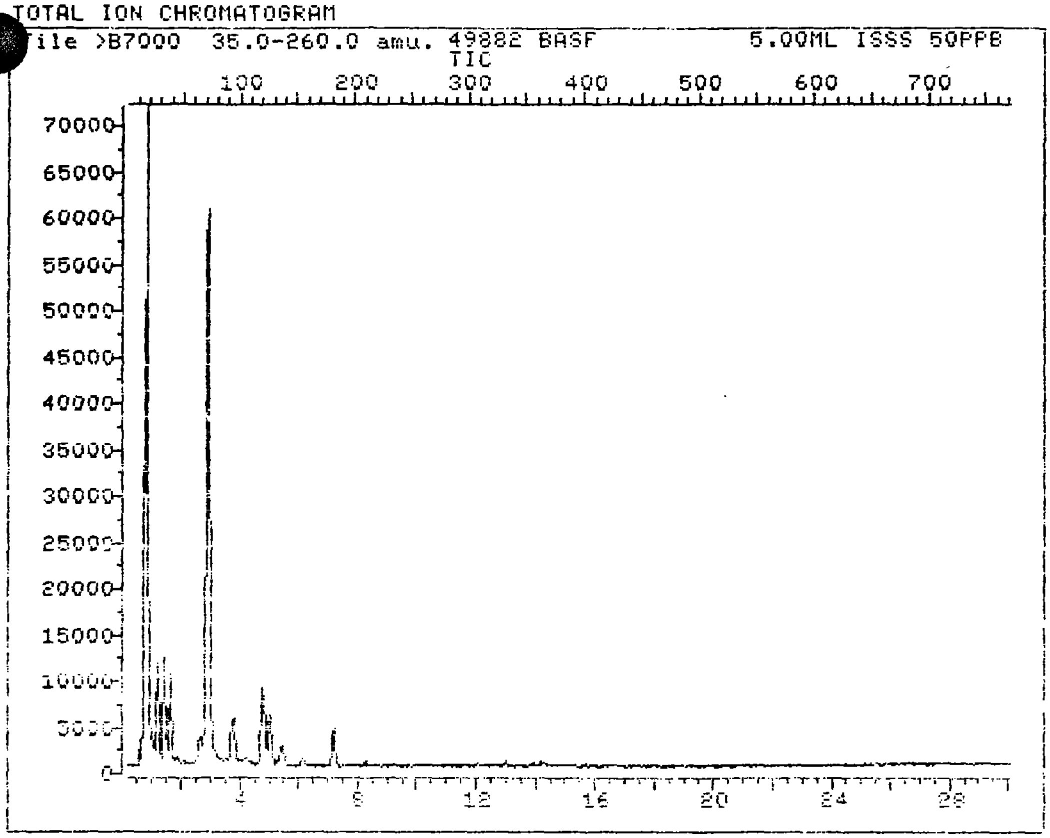
Operator ID: JIM
Output File: ^B7000::D4
Data File: >B7000::D1
Name: 49882 BASF
Misc: 5.00ML ISSS 50PPB

Quant Rev: 6
Quant Time: 901219 07:41
Injected at: 901219 06:25
Dilution Factor: 1.00000

ID File: TCLPVC::SC
Title: TCLP VOLATILE ORGANICS
Last Calibration: 901219 07:37

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Bromochloromethane	1.17	27	5874	50.00	UG/L	85
2)	Vinylchloride	.74	16	614	~~5.70~~	UG/L	100
3)	Chloroform	1.13	26	10004	34.53	UG/L	98
4)	Dichloromethane	.82	18	35018	116.21	UG/L	84
7)	Benzene	1.44	34	628	~~1.46~~	UG/L	100
8)	1-Butanol	1.05	24	796	~~147.11~~	UG/L	78
9)	d4-1,2-Dichloroethane(SS)	1.40	33	1561	40.00	UG/L	100
10)	*1,4-Difluorobenzene	1.60	38	18383	50.00	UG/L	92
14)	D8-Toluene(SS)	2.80	69	16507	45.85	UG/L	98
15)	*d5-Chlorobenzene	5.01	126	13465	50.00	UG/L	99

* Compound is ISTD



Data File: >B7000::D1 Quant Output File: ^B7000::D4
Name: 49882 BASF
Misc: 5.00ML ISSS 50PPB

Id File: TCLPVC::SC
Title: TCLP VOLATILE ORGANICS
Last Calibration: 901219 07:37

Operator ID: JIM
Quant Time: 901219 07:41
Injected at: 901219 06:25

QUANT REPORT

Operator ID: JUDY
Output File: ^A5303::D4
Data File: >A5303::A1
Name: #49882 tclp 100:1
Misc: is=40 ss=100/200

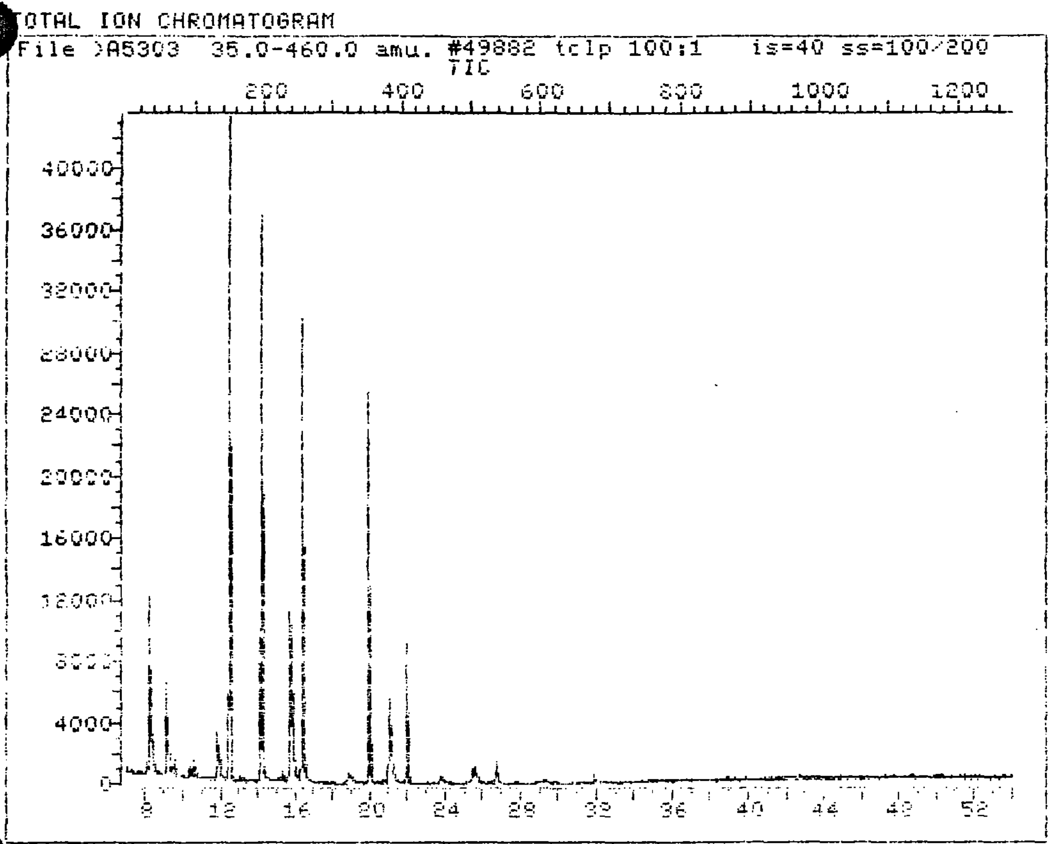
Quant Rev: 6 Quant Time: 901226 19:52
Injected at: 901226 18:57
Dilution Factor: 1.00000

BTL# 3

ID File: BNAIDD::SC
Title: BNAID FILE FOR DAILY USE
Last Calibration: 901226 14:28

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	12.42	148	21852	40.00	NG/UL	82
3)	2-Fluorophenol (Surrogate)	9.04	56	9868	15.92	NG/UL	78
4)	d5-Phenol (Surrogate)	11.83	132	7388	14.01	NG/UL	96
17)	d5-Nitrobenzene (Surrogate)	14.19	196	40731	44.08	NG/UL	85
26)	*d8-Naphthylene	16.32	254	45035	40.00	NG/UL	73
35)	2-Fluorobiphenyl (Surrogate)	19.89	351	25904	52.06	NG/UL	91
41)	*d10-Acenaphthene	21.95	407	7909	40.00	NG/UL	96
44)	2,4-Dinitrophenol	26.70	536	326	31.45	NG/UL	100
58)	*d10-Phenanthrene	26.70	536	3086	40.00	NG/UL	77
65)	d14-p-Terphenyl (Surrogate)	31.92	678	1148M	19.97	NG/UL	
68)	*d12-Chrysene	35.35	771	267M	40.00	NG/UL	
76)	*d12-Perylene	42.19	957	262M	40.00	NG/UL	

* Compound is ISTD



Data File: >A5303::A1

Quant Output File: ^A5303::D4

Name: #49882 tclp 100:1

Misc: is=40 ss=100/200

BTL# 3

Id File: BNAIDD::SC

Title: BNAID FILE FOR DAILY USE

Last Calibration: 901226 14:28

Operator ID: JUDY

Quant Time: 901226 19:52

Injected at: 901226 18:57

12-19-90
#49882
BASF

TCLP DUPLICATE ANALYSIS REPORT

All results in mg/l unless noted

ANALYTE	DUP. A mg/l	DUP. B mg/l	Mean mg/l	% RSD
Arsenic	<0.053	<0.053	5.0	106%
Mercury	<0.020	<0.005	0.010	87.0%
Selenium	<0.075	<0.075	1.00	113%
Zinc	0.065	0.060	5.00	106%
Lead	<0.042	<0.042	5.00	102%
Cadmium	<0.003	<0.003	1.00	103%
Chromium	<0.007	0.011	5.00	98.4%
Copper	0.017	0.048	5.00	93.6%
Silver	<0.050	<0.050	5.00	105%
Barium	0.003	0.046	5.00	92.5%

12-19-90
#49882
BASF

EPTOX DUPLICATE ANALYSIS REPORT

ANALYTE	DUP. A mg/l	DUP. B mg/l	Mean mg/l	RSD %
Zinc	0.115	0.112	0.114	1.87%
Copper	0.038	0.057	0.048	11.8%

Analytic & Biological Laboratories, Inc.

4350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

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METHOD DETECTION LIMITS FOR TCLP COMPOUNDS (REVISED)

This method covers the detection limits for the TCLP volatile and semi-volatile compounds. The volatile fraction is based on the ZHS extract and the semi-volatile fraction is based on the extraction fluid extracted with methlene chloride. All units are in ppm (mg/kg or mg/l).

Volatile Fraction (ZHS)

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
Benzene	0.1	0.5
Carbon Tetrachloride	0.1	0.5
Chlorobenzene	0.1	100.0
Chloroform	0.1	6.0
1,4-Dichlorobenzene	0.1	7.5
1,2-Dichloroethane	0.1	0.5
1,1-Dichloroethylene	0.1	0.7
2-Butanone (MEK)	0.1	200.0
Pyridine	0.1	5.0
Tetrachloroethylene	0.1	0.7
Trichloroethylene	0.1	0.5
Vinyl Chloride	0.1	0.2

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Semi-Volatile Fraction
Acidic Extract

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
Cresol		200.0
2-Methylphenol (o-Cresol)	1.0	200.0
3-Methylphenol (m-Cresol)	1.0	200.0
4-Methylphenol (p-Cresol)	1.0	200.0
Pentachlorophenol	1.0	100.0
2,4,5-Trichlorophenol	1.0	400.0
2,4,6-Trichlorophenol	1.0	2.0

Base/Neutral Extract

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
2,4-Dinitrotoluene	0.1	0.13
Hexachlorobenzene	0.1	0.1
Hexachloro-1,3-butadiene	0.1	0.5
Hexachloroethane	0.1	3.0
Nitrobenzene	0.1	2.0

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FAX (313) 477-4604

Metals

COMPOUNDS	REGULATORY LIMITS mg/l
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0

Herbicides & Pesticides

COMPOUNDS	LOD mg/l	REGULATORY LIMITS mg/l
Chlordane	0.01	0.03
Endrin	0.01	0.02
2,4,D	0.01	10.0
Lindane	0.01	0.4
Methoxychlor	0.01	10.0
Heptachlor	0.008	0.008
Toxaphene	0.01	0.5
2,4,5 - TP (Silvex)	0.01	1.0

Analytic & Biological
Laboratories, Inc.

4350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

(313) 477-6666
FAX (313) 477-4604

MH16C

January 8, 1990

BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MI 48192
ATTN: ADAM BICKEL

Dear Mr. Bickel,

Thank you for providing Analytic & Biological Laboratories the opportunity to serve your laboratory needs. The samples you submitted have been analyzed as requested. The laboratory results are compiled in the enclosed report.

If you have any questions regarding the results, or if we may be of further assistance to you, please call me at the published telephone number.

Yours very truly,

Francis B. McLaughlin, FAIC
Director of Laboratories

FBM/vm

Analytic & Biological
Laboratories, Inc.

4350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

(313) 477-6666
FAX (313) 477-4604

BASF CORPORATION
1609 BIDDLE AVE.
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49883

SAMPLE DESCRIPTION: MH16C

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

TCLP

Organics

Volatiles ✓

Level of Detection
See Attached

Benzene	N.D.
Carbon Tetrachloride	N.D.
Chlorobenzene	N.D.
Chloroform	N.D.
1.4 Dichlorobenzene	N.D.
1.2 Dichloroethane	N.D.
1,1 Dichloroethylene	N.D.
2-Butanone (M.E.K.)	N.D.
Pyridine	N.D.
Tetrachloroethylene	N.D.

Analytic & Biological
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BASF CORPORATION
1609 BIDDLE AVE.
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49883

SAMPLE DESCRIPTION: MH16C

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Trichloroethylene
N.D.
Vinyl Chloride
N.D.
Semivolatiles ✓

Level of Detection
See Attached
Cresol
N.D.
2 Methylphenol (o-Cresol)
N.D.
3 Methylphenol (m-Cresol)
N.D.
4 Methylphenol (p-Cresol)
N.D.
Pentachlorophenol
N.D.
2,4,5 Trichlorophenol
N.D.
2,4,6 Trichlorophenol
N.D.
2.4 Dinitroltoluene
N.D.
Hexachlorobenzene
N.D.
Hexachlorobutadiene
N.D.

Analytic & Biological Laboratories, Inc.

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BASF CORPORATION
1609 BIDDLE AVE.
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49883

SAMPLE DESCRIPTION: MH16C

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Hexachloroethane		
	N.D.	
Nitrobenzene		
	N.D.	
Metals		
Arsenic		
	<0.053	mg/l
Barium		
	0.139	mg/l
Cadmium		
	<0.003	mg/l
Chromium		
	<0.008	mg/l
Copper		
	0.033	mg/l
Lead		
	0.054	mg/l
Mercury		
	<0.020	mg/l
Selenium		
	<0.075	mg/l
Silver		
	<0.050	mg/l
Zinc		
	0.065	mg/l
pH		
	9.20	units

Analytic & Biological
Laboratories, Inc.

350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

FAX (313) 477-4604

BASF CORPORATION
1609 BIDDLE AVE.
WYANDOTTE, MI 48192

ADAM BICKEL

SAMPLE NO: 49883

SAMPLE DESCRIPTION: MH16C

RECEIVED: 12-12-90

RELEASED: 01-08-91

RELEASE #Y44757R
PLANT TPU SYN. PROJECT

Copper	
0.031 ✓	mg/l
Zinc	
0.070	mg/l
Ignitability	
No Flash up to 200 deg. ✓	F
Acid Extraction 24 Hr.	
Reactivity	
No	
Total Cyanide ✓	
<10	ppm
Total Sulfide ✓	
39	ppm

CERTIFICATIONS
NATIONAL SANITATION FOUNDATION
... QUALITY ASSURANCE PROGRAM
... STATES DEPARTMENT OF AGRICULTURE
... STATES DRUG ENFORCEMENT ADMINISTRATION
... STATES FOOD AND DRUG ADMINISTRATION
... MICHIGAN BOARD OF PHARMACY
... DEPARTMENT OF AGRICULTURE

CREDENTIALS
... AMERICAN INSTITUTE OF CHEMISTS
... AMERICAN BOARD OF BIOANALYSIS
... CHEMICAL SOCIETY

QUANT REPORT

Operator ID: JIM
Output File: ^B7001::D4
Data File: >B7001::D1
Name: 49883 BASF
Misc: 5.00ML ISSS 50PPB

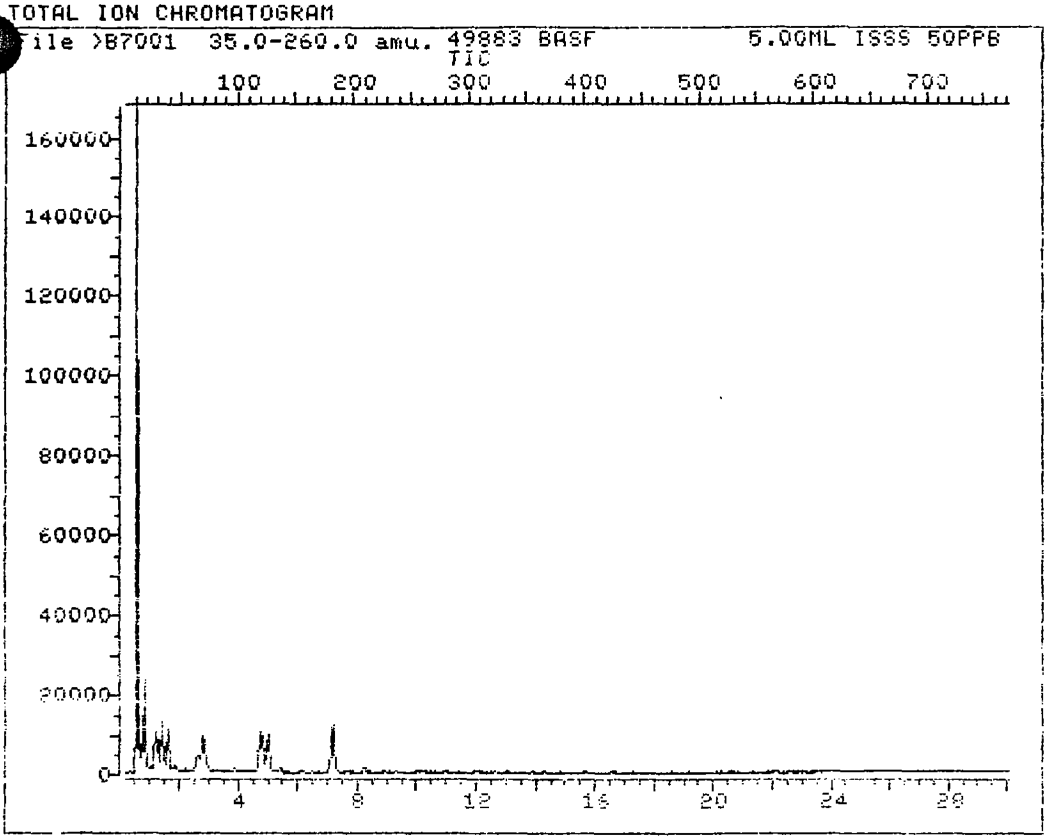
Quant Rev: 6 Quant Time: 901219 07:41
Injected at: 901219 07:02
Dilution Factor: 1.00000

ID File: TCLPVC::SC
Title: TCLP VOLATILE ORGANICS
Last Calibration: 901219 07:37

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Bromochloromethane	1.17	27	6610	50.00	UG/L	84
3)	Chloroform	1.13	26	5686	17.44	UG/L	94
4)	Dichloromethane	.82	18	11931	35.18	UG/L	77
6)	1,1-Dichloroethene	.74	16	151	.96	UG/L	77
7)	Benzene	1.44	34	863	~~1.79~~	UG/L	100
9)	d4-1,2-Dichloroethane(SS)	1.40	33	1629	37.09	UG/L	100
10)	*1,4-Difluorobenzene	1.60	38	21213	50.00	UG/L	91
11)	Carbon tetrachloride	1.28	30	879	~~3.24~~	UG/L	96
14)	D8-Toluene(SS)	2.80	69	20193	48.61	UG/L	98
15)	*d5-Chlorobenzene	5.01	126	22253	50.00	UG/L	96

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >B7001::D1 Quant Output File: ^B7001::D4
Name: 49883 BASF
Misc: 5.00ML ISSS 50PPB

Id File: TCLPVC::SC
Title: TCLP VOLATILE ORGANICS
Last Calibration: 901219 07:37

Operator ID: JIM
Quant Time: 901219 07:41
Injected at: 901219 07:02

QUANT REPORT

Operator ID: JUDY
Output File: ^A5304::D4
Data File: >A5304::A1
Name: #49883 tclp 100:1
Misc: is=40 ss=100/200

Quant Rev: 6 Quant Time: 901226 20:54
Injected at: 901226 19:59
Dilution Factor: 1.00000

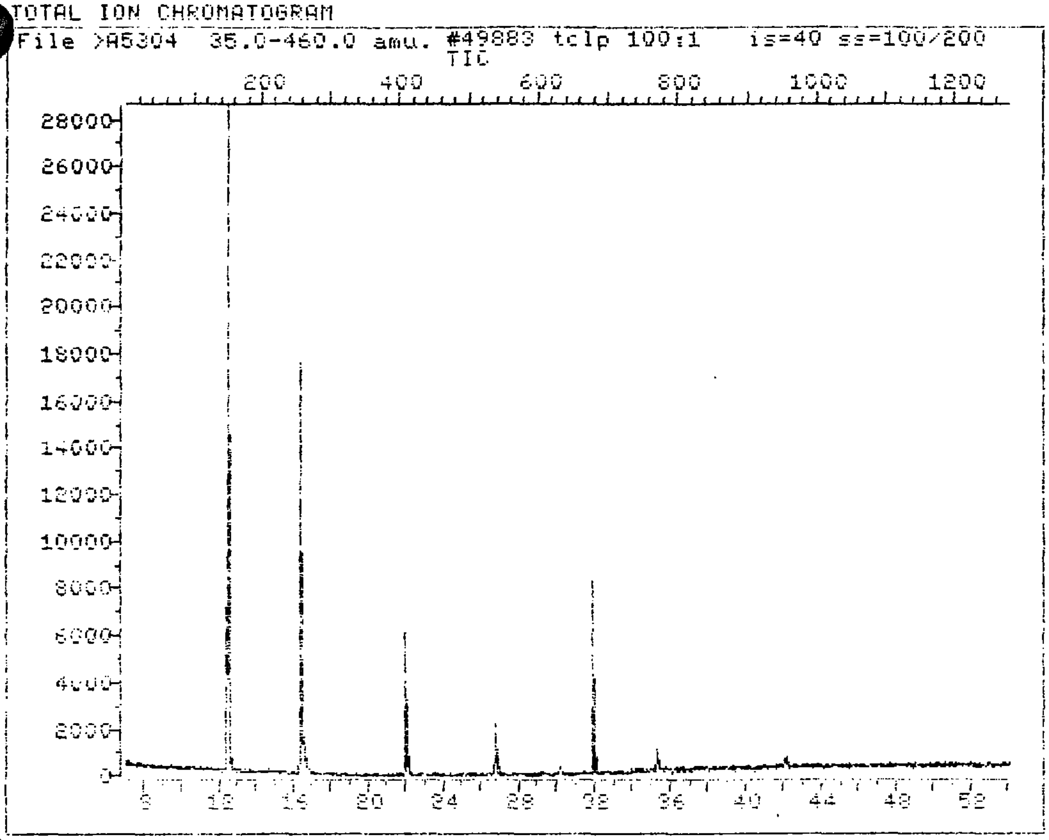
BTL# 4

ID File: BNAIDD::SC
Title: BNAID FILE FOR DAILY USE
Last Calibration: 901226 14:28

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	12.42	148	15312	40.00	NG/UL	70
26)	*d8-Naphthylene	16.32	254	35997	40.00	NG/UL	72
41)	*d10-Acenaphthene	21.95	407	6983	40.00	NG/UL	96
44)	2,4-Dinitrophenol	26.70	536	629	68.73	NG/UL	100
58)	*d10-Phenanthrene	26.70	536	4866	40.00	NG/UL	78
63)	Benzidine	26.70	536	629	70.80	NG/UL	87
65)	d14-p-Terphenyl (Surrogate)	31.92	678	11500	126.89	NG/UL	81
68)	*d12-Chrysene	35.31	770	2411	40.00	NG/UL	93
76)	*d12-Perylene	42.08	954	2148	40.00	NG/UL	93

* Compound is ISTD

TOTAL ION CHROMATOGRAM



Data File: >A5304::A1 Quant Output File: ^A5304::D4
Name: #49883 tclp 100:1
Misc: is=40 ss=100/200 BTL# 4

Id File: BNAIDD::SC
Title: BNAID FILE FOR DAILY USE
Last Calibration: 901226 14:28

Operator ID: JUDY
Quant Time: 901226 20:54
Injected at: 901226 19:59

12-19-90
#49883
BASF

TCLP MATRIX SPIKE REPORT

All results in mg/l unless noted

ANALYTE	Conc. of Spiked Sample (Xs)	Conc. of Unspiked Sample (Xy)	Known Value of Spike (K)	Percent Recovery 100(Xs-Xy)/K	Corrected Sample Value 100(Xy/%R)
Arsenic	5.36	<0.053	5.0	107%	<0.053
Mercury	0.00917	<0.005	0.010	91.7%	<0.020
Selenium	1.02	<0.075	1.00	102%	<0.075
Zinc	5.13	0.067	5.00	103%	0.065
Lead	4.48	0.048	5.00	88.6%	0.054
Cadmium	0.855	<0.003	1.00	85.5%	<0.003
Chromium	4.56	<0.007	5.00	91.2%	<0.008
Copper	4.99	0.033	5.00	99.1%	0.033
Silver	4.85	<0.050	5.00	97.0%	<0.050
Barium	4.91	0.133	5.00	95.5%	0.139

Analytic & Biological
Laboratories, Inc.

4350 INDOPLEX CIRCLE
FARMINGTON HILLS, MICHIGAN 48335

(313) 477-0066
FAX (313) 477-4604

METHOD DETECTION LIMITS FOR TCLP COMPOUNDS (REVISED)

This method covers the detection limits for the TCLP volatile and semi-volatile compounds. The volatile fraction is based on the ZHS extract and the semi-volatile fraction is based on the extraction fluid extracted with methlene chloride. All units are in ppm (mg/kg or mg/l).

Volatile Fraction (ZHS)

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
Benzene	0.1	0.5
Carbon Tetrachloride	0.1	0.5
Chlorobenzene	0.1	100.0
Chloroform	0.1	6.0
1,4-Dichlorobenzene	0.1	7.5
1,2-Dichloroethane	0.1	0.5
1,1-Dichloroethylene	0.1	0.7
2-Butanone (MEK)	0.1	200.0
Pyridine	0.1	5.0
Tetrachloroethylene	0.1	0.7
Trichloroethylene	0.1	0.5
Vinyl Chloride	0.1	0.2

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Semi-Volatile Fraction
Acidic Extract

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
Cresol		200.0
2-Methylphenol (o-Cresol)	1.0	200.0
3-Methylphenol (m-Cresol)	1.0	200.0
4-Methylphenol (p-Cresol)	1.0	200.0
Pentachlorophenol	1.0	100.0
2,4,5-Trichlorophenol	1.0	400.0
2,4,6-Trichlorophenol	1.0	2.0

Base/Neutral Extract

COMPOUND	LOD mg/l	REGULATORY LIMITS mg/l
2,4-Dinitrotoluene	0.1	0.13
Hexachlorobenzene	0.1	0.1
Hexachloro-1,3-butadienc	0.1	0.5
Hexachloroethane	0.1	3.0
Nitrobenzenc	0.1	2.0

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Metals

COMPOUNDS	REGULATORY LIMITS mg/l
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0

Herbicides & Pesticides

COMPOUNDS	LOD mg/l	REGULATORY LIMITS mg/l
Chlordane	0.01	0.03
Endrin	0.01	0.02
2,4,D	0.01	10.0
Lindane	0.01	0.4
Methoxychlor	0.01	10.0
Heptachlor	0.008	0.008
Toxaphene	0.01	0.5
2,4,5 - TP (Silvex)	0.01	1.0

APPENDIX E

Item 1.4

UNTREATED GROUNDWATER

ANALYTICAL REPORTS

- Date: May 21, 1992

  Description: Report of Soil Gas and Groundwater Survey conducted by Groundwater Technologies, Inc. (GTI) in the area of concern related to the Toluene Remediation Project. Groundwater and Soil Samples were taken from borings and were split for analysis. This report is the GTI split. This is the first phase of the Subsurface investigation necessary in determining the location of the temporary monitoring wells.

- Date: May 26, 1992

  Description: This report is the BASF, Research Services, groundwater and soil sample split from borings taken by Groundwater Technologies, Inc., during the Soil Gas and Groundwater Survey of the Toluene Remediation Project.

A Soil Boring location map follows for samples taken on May 21 and May 26, 1992.

- Date: July 9, 1992

  Description: First round of groundwater sampling. Samples were taken from the temporary monitoring wells. This is the second phase of the subsurface investigation. The purpose is to establish static concentrations of the chemical contaminants of concern. A monitoring well location map is attached to this section.

- Date: September 24, 1992

  Description: Second round of groundwater sampling. Samples were taken from the temporary monitoring wells. This is the second phase of the subsurface investigation. The purpose is to establish static concentrations of the chemical contaminants of concern. A monitoring well location map is attached to this section.

Portable Gas Chromatograph (GC)
Soil Analytical Results
BASF Corporation
Wyandotte, Michigan

Standard PQL's (Detection Limit)		µg/Kg						
		40	40	40	40	40	50	
Sample Identification	Foot Notes	Benzene	Toluene	Ethyl benzene	Xylenes	Styrene	Vinyl Chloride	PQL Multiplier
SB-1 4-6 ft	A	ND	410	ND	96	93	ND	1
SB-1 14-16 ft	B,E	ND	BDL (34)	ND	76	ND	ND	1
SB-1 18-20 ft	C,E	ND	ND	ND	ND	ND	ND	1
SB-2 0-2 ft	B,D	ND	160	ND	92	ND	ND	1
SB-2 4-6 ft	A	ND	390	ND	82	ND	ND	1
SB-2 14-16 ft	C,E	ND	78	ND	BDL (35)	ND	ND	1
SB-3 0-2 ft	B,D	ND	ND	ND	47	ND	ND	1
SB-3 10-12 ft	C,E	ND	ND	ND	ND	ND	ND	1
SB-4 0-2 ft	B,D	ND	60	ND	80	ND	ND	1
SB-4 4-6 ft	A	65	120	ND	120	ND	ND	1
SB-4 10-12 ft	C,E	ND	BDL (34)	ND	61	ND	89	1
SB-5 0-2 ft	B,D	ND	59	ND	250	ND	ND	1
SB-5 4-6 ft	A	ND	ND	ND	ND	ND	ND	1
SB-5 10-12 ft	C,E	ND	ND	ND	61	ND	ND	1
SB-6 0-2 ft	A,B	ND	ND	ND	ND	ND	ND	10
SB-6 2-4 ft	E	4200	6800	1080	6800	960	ND	2
SB-6 20-22 ft	C,E	ND	190	ND	ND	ND	ND	1
SB-7 2-4 ft	A,B	4500	3000	560	1300	ND	ND	1
SB-7 8-10 ft	E	140	ND	ND	41	ND	ND	1
SB-7 12-14 ft	C,E	ND	ND	ND	ND	ND	ND	1
SB-8 2-4 ft	A	270	38,000	3900	1320	520	ND	1
SB-8 10-12 ft	B,E	ND	360	ND	ND	ND	ND	1
SB-8 16-18 ft	C,E	ND	89	ND	ND	ND	ND	1
SB-9 2-4 ft	A,B	400	133,000	5000	360	2000	ND	2.5
SB-9 16-18 ft	E	59	2700	140	42	150	ND	1
SB-9 20-22 ft	C,E	ND	ND	ND	ND	ND	ND	1
SB-10 4-6 ft	A	1,070,000	493,000	24,500	225,000	121,000	ND	50
SB-10 10-12 ft	E	17,000	213,000	377,000	ND	53,000	ND	4
SB-10 22-24 ft	C,E	490	2700	210	ND	ND	ND	2.5
SB-11 2-4 ft	B,E	ND	86,660	22,700	ND	14,900	ND	20
SB-11 12-14 ft	E	ND	120	55	ND	ND	ND	1
SB-11 16-18 ft	C,E	72	110	ND	ND	ND	ND	1
SB-12 6-8 ft	B,E	BDL (34)	650	1300	ND	23,700	ND	2
SB-12 14-16 ft	E	ND	4050	680	470	14,000	ND	5
SB-12 20-22 ft	C,E	150	120	ND	96	88	ND	1
SB-13 4-6 ft	A	405,000	389,000	8300	549,000	116,000	ND	80*
SB-13 10-12 ft	E	700	530	140	1100	ND	ND	1
SB-13 24-26 ft	C,E	46	56	ND	130	ND	ND	1
SB-14 4-6 ft	A,B	2000	23,800	BDL (300)	15,300	1600	ND	10*
SB-14 8-10 ft	E	2100	600	300	400	270	ND	1
SB-14 24-26 ft	C,E	ND	ND	ND	ND	ND	ND	1

Table 1 (Continued)
Portable Gas Chromatograph (GC)
Soil Analytical Results
BASF Corporation
Wyandotte, Michigan
May 21, 1992

Standard PQL's (Detection Limit)		µg/Kg						
		40	40	40	40	40	50	
Sample Identification	Foot Notes	Benzene	Toluene	Ethyl benzene	Xylenes	Styrene	Vinyl Ch	PQL Multiplier
SB-15 4-6 ft	A	ND	1530	ND	ND	ND	ND	20
SB-15 6-8 ft	B,E	93	110	110	120	ND	ND	1*
SB-15 14-16 ft	C,E	190	ND	ND	50	ND	ND	1
SB-16 2-4 ft	E	BDL (380)	160,000	560	930	420	ND	10
SB-16 6-8 ft	B,E	60	24,800	640	58	1220	ND	1
SB-16 12-14 ft	C,E	ND	1550	49	62	62	ND	1
SB-17 10-12 ft	E	ND	3900	ND	ND	ND	ND	1
SB-17 16-18 ft	B,E	130	39,100	47	110	1340	ND	1
SB-17 22-24 ft	C,E	ND	3900	ND	ND	ND	ND	5*
SB-18 8-10 ft	B,E	220	140	180	390	75	ND	1
SB-18 18-20 ft	E	160	160	ND	75	ND	ND	1
SB-18 24-26 ft	C,E	220	180	ND	56	ND	ND	1

* = Co-eluting compound - not representative of matrix effects.
ND = Not Detected
PQL = Practical Quantitation Limit
BDL = Below detection limit
( ) = detected below practical quantitation limit
Sample identification depth below grade were collected.

Foot Notes:
A = Sample collected at the water table/vadose interface.
B = Highest PID sample reading in the boring.
C = Native clay
D = Sample collected above the water table.
E = Sample collected below the water table.

Table 2
Portable Gas Chromatograph (GC)
Water Analytical Results
BASF Corporation
Wyandotte, Michigan
May 21, 1992

Standard PQL's (Detection Limit)	µg/L						
	2	2	2	2	2	2.5	
Sample Identification	Benzene	Toluene	Ethyl benzene	Xylenes	Styrene	Vinyl Chloride	PQL Multiplier
SB-1	18	11	ND	6.9	ND	ND	1
SB-2	130	1700	8.8	16	40	ND	1
SB-3	BDL (1.6)	2.6	ND	ND	BDL (1.9)	140	1
SB-4	ND	ND	ND	ND	ND	ND	1
SB-5	ND	ND	ND	ND	ND	ND	1
SB-6	320	220	45	200	50	ND	1
SB-7	120	13	32	130	ND	ND	1
SB-8	9.5	220	43	ND	15	ND	1
SB-9	670	14,700	180	33	70	ND	1
SB-10	35,000	53,700	31,400	ND	4500	ND	200
SB-11	BDL (2.0)	39,500	1280	ND	32,500	ND	200*
SB-12	ND	7100	23,400	ND	58,600	ND	100
SB-13	3200	820	130	1000	ND	ND	100
SB-14	640	98	ND	77	ND	ND	20*
SB-15	3200	210	4400	130	37	ND	5
SB-16	BDL (.68)	57,600	430	ND	740	3500	40
SB-17	8.6	40	ND	13	ND	ND	1
SB-18	20	15	ND	ND	2.6	ND	1

* = Co-eluting compound – not representative of matrix effects.
ND = Not Detected
PQL = Practical Quantitation Limit
BDL = Below detection limit
( ) = detected below practical quantitation limit

djgwtab2

DSTRYBEL- GTI

BASF CORPORATION
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RESEARCH SERVICES

BASF Restricted Document

ANALYTICAL REPORT

PAGINATION : 125385
PROJECT NO. : 5P1660

PAGINATION	: 125385		
DESCRIPTION	: WYANDOTTE SOIL BORING AND WATER		
PROJECT NO.	: 5P1660		
REQUESTOR/ID	: MARTIN, MICHAEL J / 13283	Ext:	6878
COST CENTER	: 20270		
COORDINATOR/ID	: MARTIN, MICHAEL J / 13283	Ext:	6878
DATE ENTERED	: 05/26/92		
DATE FINISHED	: 09/21/92		
COPIES TO	: ADAM BICKEL		

INFORMATION/INSTRUCTIONS

REQUEST DESCRIPTION	DATE SAMPLED		SAMPLE#	ANALYSIS
WYANDOTTE SOIL BORING(SB) AND WATER(SB-1W-18W)				
SB-1W (3X40mL)	5/11/92		31563	VOLATILES
SB-2W (1X40mL)			31564	
SB-3W (2X40mL)	5/12/92		31565	VOLATILES
SB-4W (3X40mL)			31566	
SB-5W (4X40mL)			31567	
SB-6W (3X40mL)			31568	
SB-7W (3X40mL)	5/13/92		31569	VOLATILES
SB-8W (3X40mL)			31570	
SB-9W (3X40mL)			31571	
SB-10W (3X40mL)	5/14/92		31572	VOLATILES
SB-11W (3X40mL)			31573	
SB-12W (3X40mL)			31574	
SB-13W (3X40mL)	5/15/92		31575	VOLATILES
SB-14W (4X40mL)			31576	
SB-15W (3X40mL)			31577	
SB-16W (3X40mL)	5/18/92		31578	VOLATILES
SB-17W (4X40mL)			31579	
SB-18W (3X40mL)			31580	
SB-17 22-24′	5/18/92	METHANOL	31581	VOLATILES
SB-17 16-18′		EXTRACTS	31582	
SB-15 4-6′		"	31583	
SB-13 4-6′		"	31584	
SB-10 4-6′		"	31585	
SB-9 4-6′		"	31586	
SB-7 12-14′		"	31587	
SB-16 2-4′		"	31588	
SB-9 2-4′		"	31589	
SB-17 0-2′		"	31590	

APPROVAL: Michael J. Martin

BASF CORPORATION
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ANALYTICAL REPORT

PROJECT NO. : 5P1660

RESULTS

Priority Pollutant Volatiles - EPA Method 624 - S.C. Walkinshaw

These samples were analyzed by P & T GC/MS.

Compound:	Conc.(ppb) Sample #		
	31563	31564*	Blank
Chloromethane	ND	ND	ND
Vinyl Chloride	ND	ND	ND
Bromomethane	ND	ND	ND
Chloroethane	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND
Methylene Chloride	ND	9.4	ND
trans-1,2-Dichloroethene	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND
Chloroform	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND
Benzene	ND	135	ND
Carbon Tetrachloride	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
2-Chloroethylvinyl ether	ND	ND	ND
Trichloroethene	ND	ND	ND
Bromodichloromethane	ND	ND	ND
trans-1,3-Dichloropropene	ND	18	ND
cis-1,3-Dichlorpropene	ND	ND	ND
Toluene	ND	900	ND
1,1,2-Trichloroethane	ND	ND	ND
Dibromochloromethane	ND	ND	ND
Tetrachloroethene	ND	ND	ND
Chlorobenzene	ND	ND	ND
Ethylbenzene	ND	6.3	ND
Bromoform	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND

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ANALYTICAL REPORT

PAGE 3
PAGINATION : 125385
PROJECT NO. : 5P1660

Conc. (ppb)

Compound:	Sample # 31565	31566	31567	31568*	Blank
Chloromethane	ND	ND	ND	ND	33
Vinyl Chloride	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	17
Chloroethane	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	280	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
cis-1,3-Dichlorpropene	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	180	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
Dibromochloromethane	10	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	320	ND
Bromoform	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND

Conc. (ppb)

Compound:	Sample # 31569	31570	31571	Blank
Chloromethane	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND

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ANALYTICAL REPORT

PAGE 4
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Conc. (ppb)

Compound:	Sample # 31569	31570	31571	Blank
Benzene	100	ND	670	ND
Carbon Tetrachloride	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
2-Chloroethylvinyl ether	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
cis-1,3-Dichlorpropene	ND	ND	ND	ND
Toluene	ND	290	4400	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Ethylbenzene	ND	ND	190	ND
Bromoform	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND

Conc. (ppb)

Compound:	Sample # 31572	31573	31574	31575	Blank
Chloromethane	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND
Trichlorofluoromethane	3800	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	54
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,2-Dichloroethane	140	ND	ND	ND	ND
Benzene	9100	150	ND	2400	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND
cis-1,3-Dichlorpropene	ND	ND	ND	ND	ND
Toluene	15000	9200	4000	590	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND
Ethylbenzene	6000	1700	5400	770	ND
Bromoform	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

PAGINATION : 125385
PROJECT NO. : 5P1660

Compound:	Conc. (ppb) Sample #					
----------	31576	31577	31578	31580	Blank	31579
Chloromethane	ND	ND	ND	ND	ND	See
Vinyl Chloride	ND	ND	ND	ND	ND	Note 2
Bromomethane	ND	ND	ND	ND	ND	
Chloroethane	ND	ND	ND	ND	ND	
Trichlorofluoromethane	ND	ND	ND	ND	ND	
1,1-Dichloroethene	ND	ND	ND	ND	ND	
Methylene Chloride	ND	ND	ND	ND	54	
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	
1,1-Dichloroethane	ND	ND	ND	ND	ND	
Chloroform	ND	ND	ND	ND	ND	
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	
1,2-Dichloroethane	ND	ND	ND	ND	ND	
Benzene	705	2900	78	ND	ND	
Carbon Tetrachloride	ND	ND	ND	ND	ND	
1,2-Dichloropropane	ND	ND	ND	ND	ND	
2-Chloroethylvinyl ether	ND	ND	ND	ND	ND	
Trichloroethene	ND	ND	ND	ND	ND	
Bromodichloromethane	ND	ND	ND	ND	ND	
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	
cis-1,3-Dichlorpropene	ND	ND	ND	ND	ND	
Toluene	ND	ND	13000	ND	ND	
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	
Dibromochloromethane	ND	ND	ND	ND	ND	
Tetrachloroethene	ND	ND	ND	ND	ND	
Chlorobenzene	ND	1200	ND	ND	ND	
Ethylbenzene	ND	150	780	ND	ND	
Bromoform	ND	ND	ND	ND	ND	
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	

Note 1: ND = not detected, Detection limit for most compounds is 5ppb. Detection limit is X times higher in samples that were diluted than in samples that were not diluted, X = dilution factor.
Note 2: Sample 31579 was analyzed and the data file was lost after the sample had expired.

* = Xylenes also detected in these samples, 31564 at 50ppb, 31568 at 490ppb.

All volatiles raw data is filed with pagination 125298

APPROVAL: Michael J. Martin

BASF CORPORATION
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RESEARCH SERVICES

ANALYTICAL REPORT

GC/MS ANALYSIS OF METHANOL EXTRACTS FROM SOIL BORINGS - S.C.WALKINSHAW

THESE SAMPLES WERE ANALYZED BY DIRECT INJECTION OF THE METHANOL EXTRACT INTO THE GC/MS. BECAUSE OF THE HIGH LEVEL OF CONTAMINANTS EXPECTED, AND FOUND BY FIELD ANALYSIS, THEY WERE NOT ANALYZED BY PURGE AND TRAP. SAMPLES WERE QUANTITATED ONLY FOR TOLUENE, OTHER COMPOUNDS FOUND ARE LISTED BELOW.

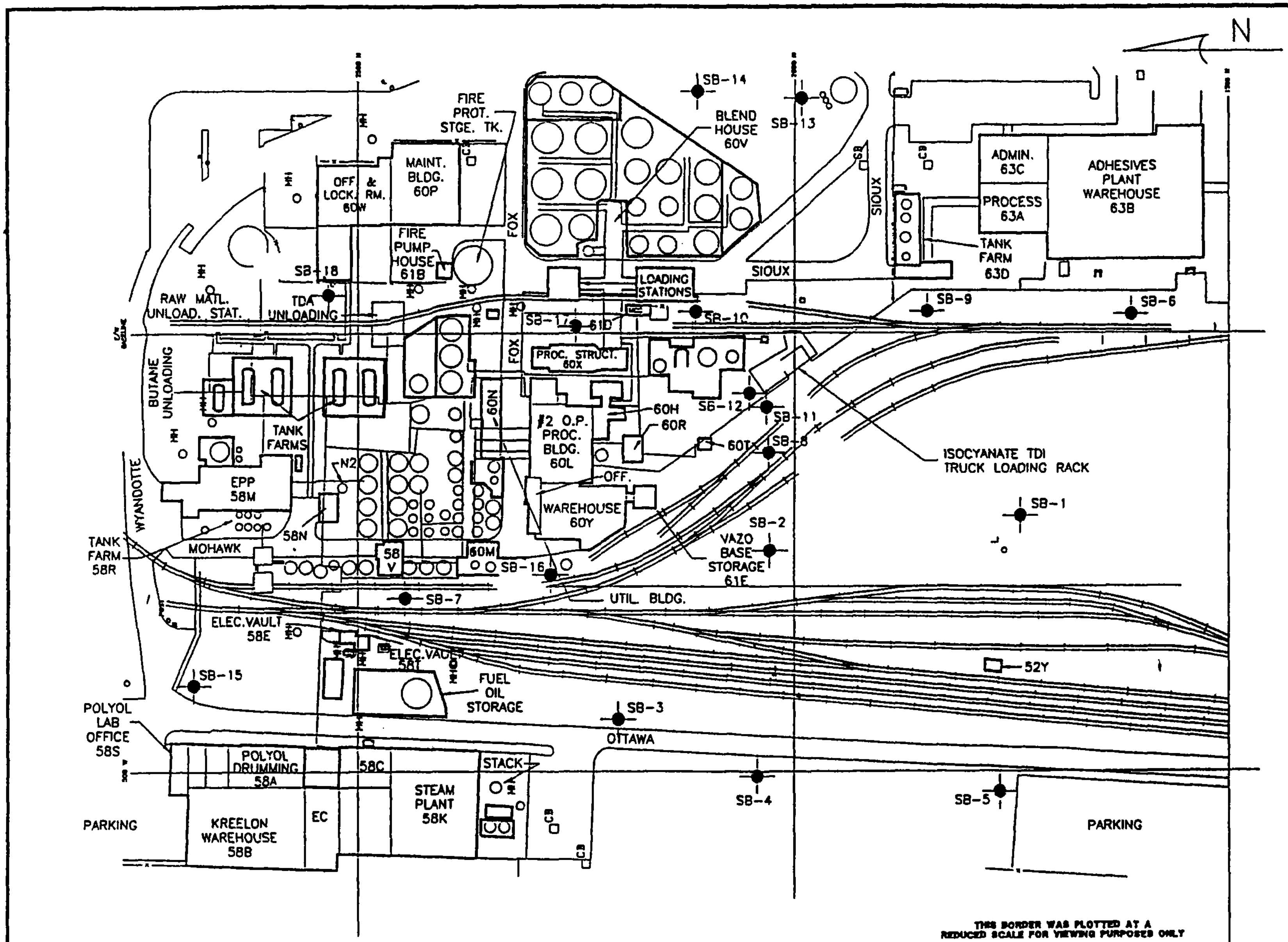
SOIL BORING	CONC. (ug/g) TOLUENE
SB-17 22-24	ND
SB-17 16-18	49
SB-15 4-6	ND
SB-13 4-6	210
SB-10 4-6	550
SB-9 4-6	580
SB-7 12-14	ND
SB-16 2-4	480
SB-9 2-4	390
SB-17 0-2	5.6

tection Limit = ~2ug/g soil

ADDITIONAL COMPOUNDS FOUND:

SOIL BORING	SB-15 4-6	SB-13 4-6	SB-10 4-6	SB-9 4-6	SB-16 2-4	SB-9 2-4
ETHYLBENZENE				*		*
TOTAL XYLENES		*	*			
STYRENE				*		*
DICHLOROBENZENE	*					
DICHLOROBENZENE	*					
METHYL BIPHENYL	*					
PENTYLHEXYLBENZENE	*					
BUTYLHEPTYLBENZENE	*					
PROPYLOCTYLBENZENE	*					
ETHYLNONYLBENZENE	*					
PENTYLHEPTYLBENZENE	*					
BUTYLOCTYLBENZENE	*					
PROPYLNONYLBENZENE	*					
ETHYLDECYLBENZENE	*					
PYRIDINE		*	*			
METHYLPYRIDINE ISOMER		*	*			
DIMETHYLPYRIDINE ISOMER		*				
CYCLOOCTATETRAENE		*				
PHENOL		*				
ALKYL PHENOL DERV.		*				
ALKYL BENZENE DERV.		*	*			
OLYNUCLEAR AROMATICS		*	*	*		*
TRACHLOROETHENE					*	

APPROVAL: Michael J. Martin



THIS BORDER WAS PLOTTED AT A REDUCED SCALE FOR VIEWING PURPOSES ONLY

PLOT SCALE: 2.28 : 1

LEGEND

SOIL BORING LOCATION

SCALE IN FEET

GROUNDWATER TECHNOLOGY, INC.

PREPARED FOR:

BASF CORPORATION

WYANDOTTE, MICHIGAN

TITLE:

SOIL BORING LOCATION MAP

DRAWING: 3

JSCHWEICKART
DSTRYBEL - GTI

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

BASF Restricted Document

ANALYTICAL REPORT

PAGINATION : 125644
PROJECT NO. : 5P1660

PAGINATION	:	125644
DESCRIPTION	:	Wyandotte Water Samples, 7/9-7/10/92
PROJECT NO.	:	5P1660
REQUESTOR/ID	:	MARTIN, MICHAEL J / 13283 Ext: 6878
COST CENTER	:	20270
COORDINATOR/ID	:	MARTIN, MICHAEL J / 13283 Ext: 6878
DATE ENTERED	:	07/13/92
DATE FINISHED	:	09/23/92
COPIES TO	:	A. Bickel

INFORMATION/INSTRUCTIONS

REQUEST DESCRIPTION	SAMPLE#	ANALYSIS
WYANDOTTE WATER SAMPLES 7/9-7/10/92		
3X40mL vials TMW-1 7/9/92 1 jar TMW-1	31677	BTEX, Styrene, Vinyl Chloride pH
3X40mL vials TMW-2 7/10/92 jar TMW-2	31678	BTEX, Styrene, Vinyl Cholride pH
3X40ML vials TMW-3 1 jar TMW-3	31679	BTEX, Styrene, Vinyl Chloride pH
3X40mL vials TMW-4 1 jar TMW-4	31680	BTEX, Styrene, Vinyl Chloride pH
3X40mL vials TMW-5 1 jar TMW-5	31681	BTEX, Styrene, Vinyl Chloride pH
3X40mL vials PW-1 1 jar PW-1	31682	BTEX, Styrene, Vinyl Chloride pH
2X40mL vials HB-WATER 1 jar soil sample	31683 31684	BTEX, Styrene, Vinyl Chloride "

***For Jar Samples# 31677, 31678, 31679, 31680, 31681, and 31682 perform the following test: ICP SCAN and check for the following ions: Cl^-, Sulfate, Phosphate, and Nitrate.

RESULTS

VOLATILES ANALYSIS -- L.J.Neubauer, S.C.Walkinshaw

APPROVAL: Michael J. Martin

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ANALYTICAL REPORT

These samples were analyzed by P & T GC/MS.

	Concentration in ppb			
	#31677	#31678	#31679	#31680
BENZENE	1800.*	1100.*	190.	110.
TOLUENE	2700.*	190.	1900.*	3100.*
ETHYLBENZENE	500.*+	N.D.	864.*+	110.
XYLENES	+	N.D.	+	N.D.
STYRENE	65.	N.D.	840.*	180.
VINYL CHLORIDE	N.D.	N.D.	N.D.	N.D.

	Concentration in ppb		
	#31681	#31682	#31683
BENZENE	30.	48.	954.*
TOLUENE	940.*	8700.*	510.*
ETHYLBENZENE	48.*	620.*+	17.*
XYLENES	N.D.	+	5.1
STYRENE	170.	1500.*	88.
VINYL CHLORIDE	N.D.	N.D.	N.D.

indicates this is only an estimated value since it is higher than the highest calibration standard.

\+ indicates that the ethylbenzene and xylene peaks were not resolved, and the amount entered for ethylbenzene is the total ethylbenzene and xylenes.

N.D. means the analyte is not present at levels equal to or greater than the method dectection limit of 5 ppb.

Source of High pH in samples -- Comments by M. J. Martin

Four of the six submitted samples have pH > 11. You asked if we could determine the source of the high pH. It appears that the high pH is due to carbonate and hydroxide ions in some of the samples and bicarbonate in the others. The details are as follows. Our initial attempt was to make the samples acidic and look for carbonic acid effervesence. None was observed. We therfore did alkalinity titrations to determine the number of breaks and to determine approximate pKa's. This data follows this section. I interpret these titration curves as indicative of carbonate ion (and some hydroxide ion) based on the number of breaks and the location of the breaks. Two samples contained bicarbonate ion breaks.

Since phosphate ion and carbonate ion produce similar titration curves

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Ion Chromatography was done to discriminate between the two ions. No phosphate was found as discussed in the Ion Chromatography section.

A metal analysis scan was done to determine if Na, K, or calcium ions were present. All of these ions can give a high pH to water samples. The other metals reported are obtained at no extra effort in the metal ion scan. These samples contain Ca at levels much higher than normal waters to this area (Ca=27 ppm, Mg= 7.3 ppm) and have Ca/Mg ratioes (Ca/Mg= 3.7) in excess of natural waters (except sample TMW-1). This finding is consistent with historical use of limestone (CaCO3) at this site. Potassium and sodium in this water is expected from polyol production and from soda ash production.

I have summarized the pertinent data supporting the high pH in the Table below.

Client Samp No	RS Sample Number	pH	# of Breaks	Break Type	Na ppm	K ppm	Ca ppm	Mg ppm	Ca/Mg
TMW-1	31677	8.98	1	HCO3	145	19	83	28	3.0
TMW-2	31678	6.45	1	HCO3	140	33	190	34	5.6
TMW-3	31679	11.36	2	CO3/OH	1000	130	125	6.1	21
TMW-4	31680	11.57	2	CO3	175	110	265	27	9.8
TMW-5	31681	12.35	2	CO3/OH	360	64	875	14	63
PW-1	31682	11.44	2	CO3/OH	52	15	130	<0.5	260

FUNCTIONAL GROUP ANALYSIS...T.L.MCGAHEY

SAMPLE#	pH (AS IS)
31677	8.98
31678	6.45
31679	11.36
31680	11.57
31681	12.35
31682	11.44

SAMPLE	PH	.01N HCL	MEQ/G
31677	EP1/5.0	2.461	.002 HCO3
31678	EP1/5.0	27.60	.013 HCO3
31679	EP1/8.0	9.050	.0010 CO3
	EP2/4.9	11.80	.0024 OH

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31680	EP1/8.3	8.44	.01052 CO3
	EP2/5.3	18.723	.001147 HCO3
31681	EP1/8.3	4.448	.0128 CO3
	EP2/5.0	6.514	.0148 OH
31682	EP1/8.4	4.212	.0014 CO3
	EP2/4.9	6.755	.0009 OH
NAHCO3	EP1/4.5	9.394	.0939 HCO3

WEIGHTS OF SAMPLES WERE ADDED TO DISTILLED WATER AND TITRATED POTENTIOMETRICALLY WITH .01N HCL.

SAMPLE 31679 HAD AN EXTREMELY OBSCURE 2ND ENDPOINT SO A PH OF 4.9 WAS USED AS THE END POINT SINCE THE OTHER SAMPLES 2ND ENDPOINT WAS AT PH=4.8 TO PH=5

SAMPLE 31680 THE PHENOLPHTHALEIN EP IS LESS THAN 1/2 OF THE METHYL ORANGE ENDPOINT WHICH INDICATES THE BASIC SPECIES AS HCO3 AND CO3, IF YOU ASSUME THAT THE ONLY SPECIES POSSIBLY PRESENT ARE OH, HCO3, AND CO3.

TITRATED .0953 MEQ OF NAHCO3 TO SEE IF THE BREAK WAS BETTER THAN THE 2ND BREAK OF THE SAMPLES. IT WAS A BETTER BREAK. RECOVERY = 98.5%

_____Metals Analysis--N. M. Less_____

These samples were prepared for analysis following EPA SW-846 (3rd Edition) Method 3010. The samples were analyzed using the following methods: flame atomic absorption spectroscopy (potassium); and inductively coupled plasma atomic emission spectroscopy (all other metals). Values which are less than the method detection limit (MDL) are reported as not detected (ND). Other values which are greater than the MDL but less than the practical quantification limit (PQL) are reported as "< PQL".

		RS #31677 TMW-1		RS #31678 TMW-2		RS #31679 TMW-3	
		Trial 1	Trial 2	Trial 1	Trial 2	Trial 1	Trial 2
Aluminum	(ppm)	<1.0	<1.0	1.1	1.4	<1.0	<1.0
Antimony	(ppm)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Beryllium	(ppm)	ND	ND	ND	ND	ND	ND
Boron	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	(ppm)	ND	ND	ND	ND	ND	ND
Calcium	(ppm)	83.	90.	190.	190.	120.	130.
Chromium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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Cobalt	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	(ppm)	ND	ND	ND	ND	ND	ND
Iron	(ppm)	1.3	1.4	25.	26.	<0.5	<0.5
Lead	(ppm)	ND	ND	ND	ND	ND	ND
Lithium	(ppm)	<0.5	<0.5	ND	ND	<0.5	<0.5
Magnesium	(ppm)	28.	29.	34.	34.	5.8	6.4
Manganese	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	(ppm)	ND	ND	ND	ND	ND	ND
Nickel	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phosphorous	(ppm)	<1.0	<1.0	<1.0	<1.0	ND	ND
Potassium	(ppm)	19.	20.	33.	33.	130.	130.
Selenium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sodium	(ppm)	140.	150.	140.	140.	990.	1000.
Vanadium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	(ppm)	ND	ND	ND	ND	4.4	4.8

		RS #31680 TMW-4		RS #31681 TMW-5		RS #31682 PW-1	
		Trial 1	Trial 2	Trial 1	Trial 2	Trial 1	Trial 2
Aluminum	(ppm)	11.	12.	5.0	5.2	<1.0	<1.0
Antimony	(ppm)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Beryllium	(ppm)	ND	ND	ND	ND	ND	ND
Boron	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	(ppm)	ND	ND	ND	ND	ND	ND
Calcium	(ppm)	260.	270.	880.	870.	130.	130.
Chromium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	(ppm)	<0.5	<0.5	ND	ND	ND	ND
Copper	(ppm)	ND	ND	ND	ND	ND	ND
Iron	(ppm)	11.	12.	4.1	4.5	<0.5	<0.5
Lead	(ppm)	ND	ND	<0.5	ND	ND	ND
Lithium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	(ppm)	26.	28.	14.	15.	<0.5	<0.5
Manganese	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	(ppm)	ND	ND	ND	ND	ND	ND
Nickel	(ppm)	<0.5	<0.5	ND	ND	ND	ND
Phosphorous	(ppm)	<1.0	<1.0	<1.0	<1.0	ND	ND
Potassium	(ppm	110.	110.	64.	64.	15.	15.
Selenium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sodium	(ppm)	180.	170.	360.	360.	54.	51.
Vanadium	(ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	(ppm)	ND	ND	ND	ND	ND	ND

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

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		MDL
Aluminum	(ppm)	0.07
Antimony	(ppm)	0.05
Arsenic	(ppm)	0.02
Barium	(ppm)	0.006
Beryllium	(ppm)	0.006
Boron	(ppm)	0.01
Cadmium	(ppm)	0.006
Calcium	(ppm)	0.03
Chromium	(ppm)	0.01
Cobalt	(ppm)	0.01
Copper	(ppm)	0.006
Iron	(ppm)	0.02
Lead	(ppm)	0.10
Lithium	(ppm)	0.006
Magnesium	(ppm)	0.07
Manganese	(ppm)	0.006
Molybdenum	(ppm)	0.02
Nickel	(ppm)	0.03
Phosphorous	(ppm)	0.1
Potassium	(ppm)	0.02
Selenium	(ppm)	0.08
Silver	(ppm)	0.006
Sodium	(ppm)	0.3
Vanadium	(ppm)	0.01
Zinc	(ppm)	0.006

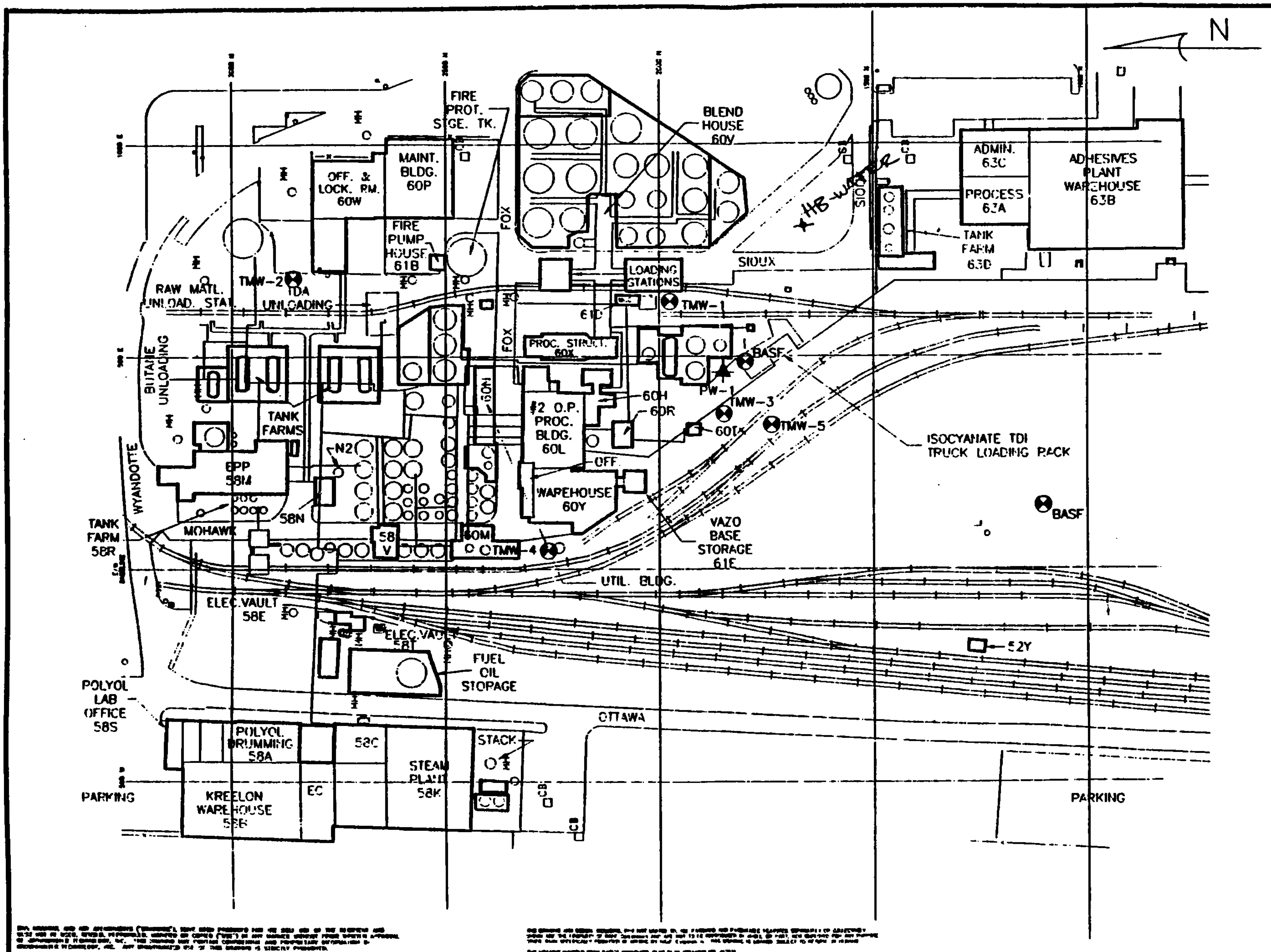
Ion Chromatography Analysis - W.A. Genaw/E.L. Yee

The samples were analyzed on a Dionex IonPac AS3 column with an eluant of 1.9 mM $NaHCO_3$ + 2.0 mM Na_2CO_3. The anions in the samples were detected by chemically suppressed conductivity with a Dionex AMMS-1 micromembrane suppressor unit. The following results were obtained by an external standard quantitation procedure.

Sample Number	ppm Chloride	ppm Sulfate
31677	120	270
31678	210	4
31679	1700	39
31680	260	110
31681	540	97
31682	42	160

No phosphate was detected in any of the samples. The detection limit for PO_4 under our conditions is ~1 ppm. A trace quantity of nitrate (<5 ppm) appears to be present in each sample.

APPROVAL: Michael G. Martin



LEGEND

- PURGE WELL
- TEMPORARY OR MONITORING WELL
- EXISTING BASF MONITORING WELL

0 50 100

SCALE IN FEET

SIGNATURE	DATE
TERRITORY ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

GROUNDWATER TECHNOLOGY, INC.

PREPARED FOR:

BASF CORPORATION

WYANDOTTE, MICHIGAN

TITLE:

PURGE/MONITORING WELL LOCATION MAP

SCALE: 1" = 50'

DRAWING: 3

bc: B BARKEL
P GREEFER
DAN STRYBEL

PAGINATION : 126083
PROJECT NO. : 5P1660

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

BASF Restricted Document

ANALYTICAL REPORT

PAGINATION	: 126083		
DESCRIPTION	: WYANDOTTE WATERS		
PROJECT NO.	: 5P1660		
REQUESTOR/ID	: MARTIN, MICHAEL J / 13283	Ext:	6878
COST CENTER	: 20270		
COORDINATOR/ID	: MARTIN, MICHAEL J / 13283	Ext:	6878
DATE ENTERED	: 09/24/92		
DATE FINISHED	: 10/07/92		
COPIES TO	: A. BICKEL		

INFORMATION/INSTRUCTIONS

SAMPLE DESCRIPTION		SAMPLE #	ANALYSIS
TMW-1	3 40ml vials 1 liter jar	31853	BTEX, Styrene, Vinyl Chloride pH
TMW-2	3 40ml vials 1 liter jars	31854	BTEX, Styrene, Vinyl Chloride pH
TMW-3	3 40ml vials 1 liter jar	31855	BTEX, Styrene, Vinyl Chloride pH
TMW-4	3 40ml vials 1 liter jar	31856	BTEX, Styrene, Vinyl Chloride pH
TMW-5	3 40ml vials 1 liter jars	31857	BTEX, Styrene, Vinyl Chloride pH
TMW-6	3 40ml vials 1 liter jar	31858	BTEX, Styrene, Vinyl Chloride

RESULTS

SAMPLE	pH AS IS
31853	7.27
31854	6.45
31855	11.90
31856	11.12
31857	11.82
31858	8.33

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

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VOLATILES ANALYSIS -- L. J. Neubauer

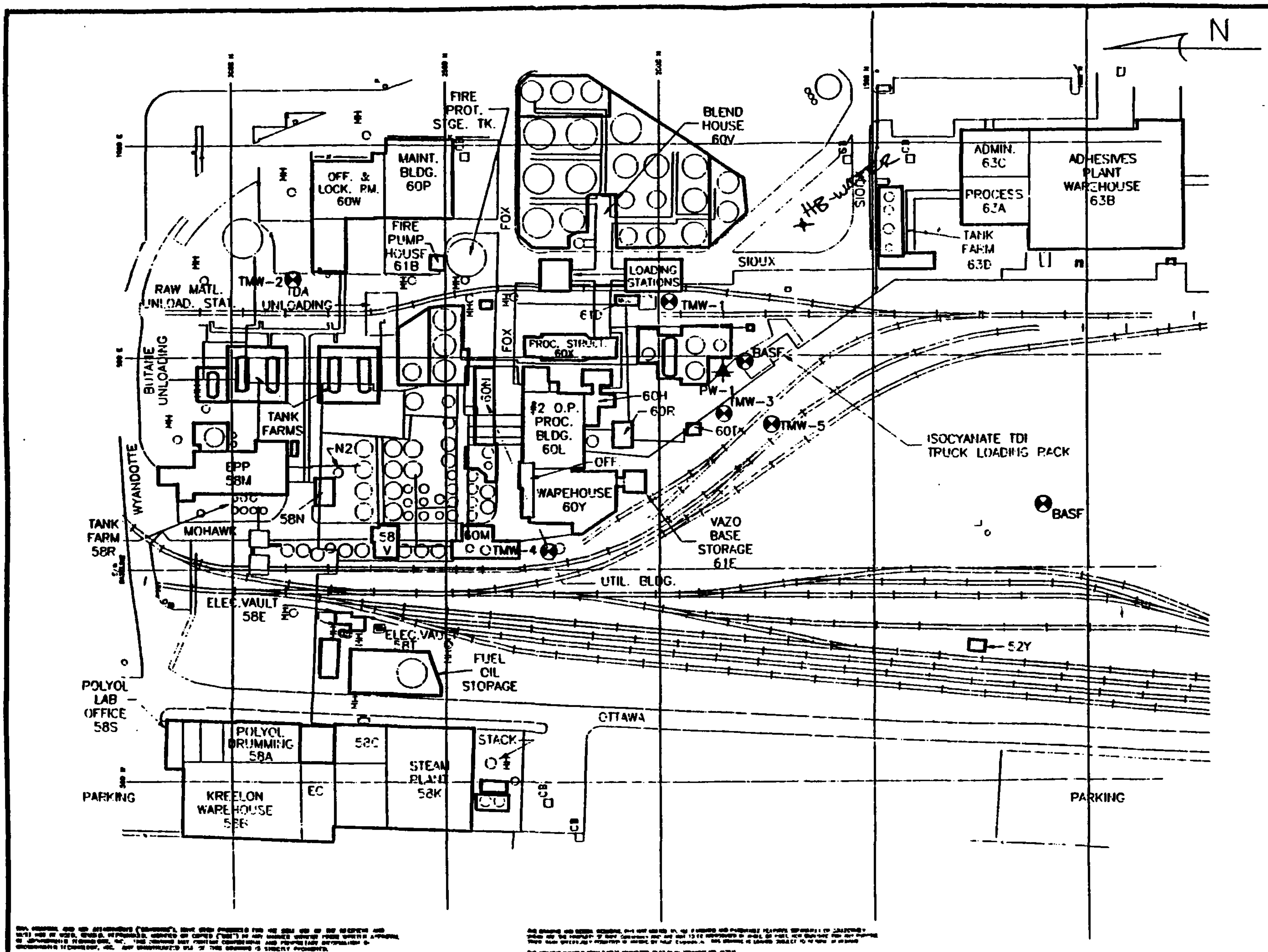
These samples were analyzed by P & T GC/MS in two sample sets. In the first set, the samples were diluted 1:100 to quantify analytes in the 500 to 15000 bbp range. The second set was undiluted and quantified analytes in the 5 to 150 ppb range.

	Concentration in ppb			
	#31853 TMW-1	#31854 TMW-2	#31855 TMW-3	#31856 TMW-4
BENZENE	14000.	640.	610.	290.*
TOLUENE	19000.	180.*	13000.	22000.*
ETHYLBENZENE	9100.	38.	8800.	500.
XYLENES	1600.	24.	<500.	36.
STYRENE	200.*	9.4	22000.*	8800.
VINYL CHLORIDE	5.6	<5.	<5.	8.6

	Concentration in ppb		
	#31857 TMW-5	#31858 TMW-6	BLANK
BENZENE	83.	80.	<5.
TOLUENE	5300.	21000.*	<5.
ETHYLBENZENE	540.	21000.*	<5.
XYLENES	31.	<500.	<5.
STYRENE	4100.	>20000.	<5.
VINYL CHLORIDE	<5.	<5.	<5.

* This is only an estimated value since it is higher than the highest calibration standard for this run. Historically, the standard calibration curve for this method remains linear in this range.

APPROVAL: Laura J Neubauer 10/7/92
MJM



LEGEND

- PURGE WELL
- TMW-2 - TEMPORARY OR MONITORING WELL
- BASF - EXISTING BASF MONITORING WELL

SCALE IN FEET

GROUNDWATER TECHNOLOGY, INC.

PREPARED FOR:

BASF CORPORATION

WYANDOTTE, MICHIGAN

PURGE/MONITORING WELL LOCATION MAP

3

APPENDIX F

EXHIBIT 1

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

Stevens T. Mason Building, P.O. Box 30028, Lansing, MI 48909

ROLAND HARMES, Director

September 21, 1993

CERTIFIED MAIL

BASF Corporation
Chemicals Division
1609 Biddle Avenue
Wyandotte, Michigan 48192

Gentlemen:

SUBJECT: NPDES Permit No. MI0000540

Your National Pollutant Discharge Elimination System (NPDES) Permit has been processed in accordance with appropriate state and federal regulations. It contains the requirements necessary for you to comply with state and federal water pollution control laws.

REVIEW THE PERMIT EFFLUENT LIMITS AND COMPLIANCE SCHEDULES CAREFULLY. These are subject to the criminal and civil enforcement provisions of both state and federal law. Permit violations are audited by the Michigan Department of Natural Resources and the United States Environmental Protection Agency and may appear in a published quarterly noncompliance report made available to agencies and the public.

Your monitoring and reporting responsibilities must be complied with in accordance with this permit. If applicable, Discharge Monitoring Report forms will be transmitted to you in the near future. These reports are to be submitted monthly or otherwise as required by your NPDES permit.

Any reports, notifications, or questions regarding the attached permit or NPDES program should be directed to the following address:

Roy Schrameck, District Supervisor
Detroit Area District Office
38980 Seven Mile Road
Livonia, Michigan 48152
Telephone: (313) 953-0241

Eco[illegible] Serv[illegible] [illegible]ment
SEP 27 1993

NOTE: All references within this permit made to the Water Quality Division or Chief of the Water Quality Division are to refer to the Surface Water Quality Division or Chief of the Surface Water Quality Division, respectively.

Sincerely,

William E. McCracken

William E. McCracken, P.E.
Chief, Permits Section
Surface Water Quality Division
517-373-8088

Enclosure: Permit

cc: EPA-Region V (2)
208 Agency - Southeast Michigan Council of Governments
Planning and Special Programs Section, SWQD
Mr. Roy Schrameck - Detroit District, SWQD (2)
Mr. Paul Blakeslee, Regional Supervisor, Region III, SWQD
Data Entry, SWQD
Files

PERMIT NO. MI0000540

MICHIGAN WATER RESOURCES COMMISSION
AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et seq; the "Act"), and the Michigan Water Resources Commission Act, as amended, (Act 245, Public Acts of 1929, as amended, the "Michigan Act"),

BASF Corporation
Chemicals Division
1609 Biddle Avenue
Wyandotte, Michigan 48192

is authorized to discharge from a facility located at

1609 Biddle Avenue
Wyandotte, Michigan 48192

designated as BASF-Wyandotte

to the receiving water named the Detroit River (Trenton Channel) in accordance with effluent limitations, monitoring requirements and other conditions set forth in this permit.

This permit takes effect on December 1, 1993. Any person who feels aggrieved by this permit may file a sworn petition with the Executive Secretary of the Michigan Water Resources Commission, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Commission may reject any petition filed more than 60 days after issuance as being untimely. Upon granting of a contested case to the applicant, the Commission shall review the permit to determine which contested term shall be stayed until the Commission takes its final action. If a contested condition is a requirement placed on wastewater covered by a new or increased discharge authorization, such increased discharge authorization shall be stayed until the Commission takes final action. All other conditions of the permit remain in full effect. If the contested condition is a modification of a previous permit condition and the Commission determines the contested condition shall be stayed, then such previous condition remains in effect until the Commission takes final action. During the course of any administrative proceeding brought by a person other than the applicant, the conditions of this permit will remain in effect, unless the Commission determines otherwise.

This permit and the authorization to discharge shall expire at midnight October 1, 1997. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit such information and forms as are required by the Michigan Water Resources Commission to the Permits Section of the Surface Water Quality Division no later than 180 days prior to the date of expiration.

This permit is based on an application submitted on April 6, 1992, as amended through June 4, 1993. On its effective date this permit shall supersede NPDES Permit No. MI0000540, expiring October 1, 1992.

Issued this 19th day of August, 1993, by the Michigan Water Resources Commission.

William E. McCracken
William E. McCracken
Executive Secretary

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Final Effluent Limitations, Outfall 001

Beginning upon the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge seven million six hundred thousand (7,600,000) gallons per day of process wastewater, noncontact cooling water, deionizer backwash water and an unspecified amount of storm water runoff and contaminated groundwater seepage from outfall 001 to the Detroit River (Trenton Channel). Such discharge shall be limited and monitored by the permittee as specified below:

	Discharge Limitations				Monitoring Requirements	
	lbs/day		Other Limitations			
Effluent Characteristic	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	(report)	(report)			Daily	Report Total Daily Flow
Total Suspended Solids						
Influent			(report)	(report)	5X/Week	24-Hr Composite
Effluent			(report)	(report)	5X/Week	24-Hr Composite
Net Discharge (See Part I.A.1.a.)	500	1914	20 mg/l	60 mg/l	5X/Week	24-Hr Composite
BOD_5						
Influent			(report)	(report)	Weekly	24-Hr Composite
Effluent			(report)	(report)	Weekly	24-Hr Composite
Net Discharge (See Part I.A.1.b.)	473	1251			Weekly	24-Hr Composite
Total Organic Carbon (See Part I.A.1.c.)	2500	15800	100 mg/l	250 mg/l	Daily	Continuous
Toluene	0.29	0.78			Weekly	Grab
Temperature (°F)			(report)	(report)	Weekly	Reading
Total Cadmium (ug/l)			(report)	(report)	Weekly	24-Hr Composite
Total Lead (ug/l)			(report)	(report)	Weekly	24-Hr Composite
Total Mercury (ug/l)				(report)	Quarterly	24-Hr Composite
Trichloroethylene (ug/l)				(report)	Quarterly	Grab
Outfall Observation (report)					Daily	Visual
			Daily Minimum	Daily Maximum		
pH (Standard Units)			6.0	9.0	Daily	Continuous

(continued)

PART I

Section A.1. (continued)

a. Net Total Suspended Solids (TSS) concentrations shall be defined as the difference between influent and effluent concentrations. The mass limitations (lbs/day) for Net TSS shall be calculated using Net TSS concentrations and effluent flow rates.

b. Net BOD-5 concentrations shall be defined as the difference between influent and effluent concentrations. The mass limitations (lbs/day) for Net BOD-5 shall be calculated using Net BOD-5 concentrations and effluent flow rates.

c. The daily maximum total organic carbon (TOC) is defined as the arithmetic mean of the daily instantaneous TOC values. The TOC shall not exceed 450 mg/l as an instantaneous maximum for more than 60 minutes. The permittee shall report any exceedance and the time exceeded with the discharge monitoring report (DMR).

d. Analyses shall be performed using U.S. EPA approved methods. Total mercury shall be analyzed using U.S. EPA test method 245.1 with a detection level of 0.2 ug/l, unless higher levels are appropriate due to sample matrix interference. Detection levels for total cadmium, total lead and trichloroethylene shall be 0.2 ug/l, 1 ug/l and 1 to 10 ug/l, respectively, unless higher levels are appropriate due to sample matrix interference. Quarterly samples shall be taken in January, April, July and October. After January 1, 1995, the permittee may request reduction or elimination of monitoring for cadmium and/or lead. This request shall be submitted to Detroit District Supervisor of the Surface Water Quality Division. Upon receipt of written approval, and consistant with such approval, the permittee may reduce or eliminate monitoring for cadmium and/or lead.

e. The receiving stream shall contain no unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits as a result of this discharge.

f. Samples, measurements, and observations taken in compliance with the monitoring requirements above shall be taken prior to discharge to the Detroit River (Trenton Channel).

g. Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits) shall be reported immediately to the Detroit District Supervisor of the Surface Water Quality Division followed with a written report within 5 days detailing the findings of the investigation and the steps taken to correct the condition.

h. In the event the permittee shall require the discharge of water treatment additives in addition to any previously approved by the Detroit District Supervisor of the Surface Water Quality Division, the permittee shall notify the Detroit District Supervisor. Written approval from the Detroit District Supervisor to discharge such additives at specified levels shall be obtained prior to discharge by the permittee. The permit may be modified in accordance with the requirements of Part II.B.4. if a constituent of the additive or additives requires limiting.

i. The term noncontact cooling water shall mean water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product, or finished product.

PART I

Section A.

2. Final Effluent Limitations, Outfall 002

Beginning upon the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge one million two hundred thousand (1,200,000) gallons per day of noncontact cooling water and an unspecified amount of storm water runoff from outfall 002 to the Detroit River (Trenton Channel). Such discharge shall be limited and monitored by the permittee as specified below:

	Discharge Limitations				Monitoring Requirements	
	lbs/day		Other Limitations			
Effluent Characteristic	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	(report)	(report)			5X/Week	Report Total Daily Flow
Temperature (°F)			(report)	(report)	Weekly	Reading
Outfall Observation	(report)				5X/Week	Visual

a. The receiving stream shall contain no unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits as a result of this discharge.

b. Samples, measurements, and observations taken in compliance with the monitoring requirements above shall be taken prior to dicharge into the Detroit River (Trenton Channel).

c. Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits) shall be reported immediately to the Detroit District Supervisor of the Surface Water Quality Division followed with a written report within 5 days detailing the findings of the investigation and the steps taken to correct the condition.

d. The term noncontact cooling water shall mean water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product, or finished product.

e. In the event the permittee shall require the discharge of water treatment additives in addition to any previously approved by the Detroit District Supervisor of the Surface Water Quality Division, the permittee shall notify the Detroit District Supervisor. Written approval from the Detroit District Supervisor to discharge such additives at specified levels shall be obtained prior to discharge by the permittee. The permit may be modified in accordance with the requirements of Part II.B.4. if a constituent of the additive or additives requires limiting.

PART I

Section A.

3. Final Effluent Limitations, Outfall 003

Beginning upon the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge five million (5,000,000) gallons per day of noncontact cooling water and an unspecified amount of storm water runoff and contaminated groundwater seepage from outfall 003 to the Detroit River (Trenton Channel). Such discharge shall be limited and monitored by the permittee as specified below:

	Discharge Limitations				Monitoring Requirements	
	lbs/day		Other Limitations			
Effluent Characteristic	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type
Flow (MGD)	(report)	(report)			Daily	Report Total Daily Flow
1,2-Dichloroethane				(report)	Monthly	Grab
1,2-Dichloropropane			50 ug/l	100 ug/l	Weekly	Grab
bis(2-Chloroisopropyl)ether			100 ug/l	200 ug/l	Weekly	24-Hr Composite
Total Phosphorus (mg/l)				(report)	Quarterly	24-Hr Composite
Temperature (°F)			(report)	(report)	Weekly	Reading
Outfall Observation (report)					5X/Week	Visual

a. Samples, measurements, and observations taken in compliance with the monitoring requirements above shall be taken prior to discharge to the Detroit River (Trenton Channel).

b. Analyses shall be performed using U.S. EPA approved methods. Samples for 1,2-dichloroethane and 1,2-dichloropropane shall be analyzed by Method 601 and samples for bis(2-chloroisopropyl)ether shall be analyzed by Method 611 or 625. Alternate methods may be used upon approval by the Detroit District Supervisor of the Surface Water Quality Division. Quarterly samples shall be taken in January, April, July and October.

c. The receiving stream shall contain no unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits as a result of this discharge.

d. Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, or deposits) shall be reported immediately to the Detroit District Supervisor of the Surface Water Quality Division followed with a written report within 5 days detailing the findings of the investigation and the steps taken to correct the condition.

(continued)

PART I

Section A.3. (continued)

e. The term noncontact cooling water shall mean water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product, or finished product.

f. In the event the permittee shall require the discharge of water treatment additives in addition to any previously approved by the Detroit District Supervisor of the Surface Water Quality Division, the permittee shall notify the Detroit District Supervisor. Written approval from the Detroit District Supervisor to discharge such additives at specified levels shall be obtained prior to discharge by the permittee. The permit may be modified in accordance with the requirements of Part II.B.4. if a constituent of the additive or additives requires limiting.

4. Special Condition - Reopener Clause

This permit may be modified or, alternatively, revoked and reissued to comply with any applicable standard(s) or limitation(s) promulgated under Section 301(b)(2)(c)(d), 304(b)(2) and 307(a)(2) of the Act, if the effluent standard(s) or limitation(s) so promulgated:

a. is(are) either different in condition or more stringent than any effluent limitation in the permit; or

b. control(s) any pollutant not limited in the permit.

5. Discharge to the Groundwaters

This site is a known source of groundwater pollution. The reissuance of this permit does not authorize any discharge to the groundwaters or venting of contaminated groundwaters to the surface waters, nor does it constitute a release of liability for any groundwater contamination at or around the site. The State reserves its rights to seek remedies to abate any groundwater contamination.

PART I

Section A.

6. Special Condition - Notification Requirement

The permittee shall notify the Detroit District Supervisor of the Surface Water Quality Division, in writing, within 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of:

a. Detectable levels* of chemicals on the current Michigan Critical Materials Register or priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, which were not acknowledged in the application** or listed in the application at less than detectable levels.

b. Detectable levels* of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information.

c. Any chemical at levels greater than five times the average level reported in the application**.

Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the schedule of compliance.

*The detectable level shall be defined as the Method Detection Limit (MDL) as given in Appendix B to Part 136, Federal Register, Vol. 49, No. 209, October 26, 1984, pp. 43430-31.

**The application submitted on April 6, 1992, as amended through June 4, 1993.

7. Special Condition - Intake Screen Backwash

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge intake screen backwash to the Detroit River. The permittee shall collect and remove debris accumulated on intake trash bars and dispose of such material on land in an appropriate manner.

PART I

Section A.

8. Special Condition - Chemical Specific Toxicity Testing

The permittee shall provide acute toxicity data for propylene oxide for the purpose of developing allowable discharge concentrations. These data shall include 1) a 96-hour LC50 for rainbow trout or fathead minnow; 2) a 48-hour EC50 for Daphina species; and 3) a rat oral LD50. Procedures for the aquatic testing shall follow ASTM, Standard E 729-88. Procedures for the rat test shall follow ASTM, TSCA Health Effects Testing Guidelines (59 FR 39397, 9/27/85). Alternate procedures may be used upon approval of the Detroit District Supervisor of the Surface Water Quality Division. The permittee may submit peer reviewed published literature for the required data in place of aquatic toxicity testing. Prior to conducting the testing and prior to January 1, 1994, a plan describing the proposed tests and a schedule for completion of the tests and submittal of the results shall be submitted to the Detroit District Supervisor of the Surface Water Quality Division. Upon receipt of written approval the plan shall be implemented. Within three months of receiving approval for the plan, the testing shall be completed consistant with such approval and the results submitted to the Detroit District Supervisor of the Surface Water Quality Division.

9. Special Condition - Compliance Demonstration for Water Additive(s).

The authorization to discharge water additive Betz Slimicide C-74 from outfall 001 beyond January 1, 1994 will require the permittee to submit to the Detroit District Supervisor of the Surface Water Quality Division, sufficient data to demonstrate that the concentration of the above mentioned water additive in the discharge does not exceed the effluent limitation of 80 ug/l. The concentration of the water additive in the discharge shall be determined by analyses or, if an approved analytical technique is not available, by calculation based on the mass balance through the system. The discharge concentration data shall be submitted to the Detroit District Supervisor of the Surface Water Quality Division by January 1, 1994.

If, as determined by the Detroit District Supervisor, the water additive, as currently used, does not exceed the effluent limitation, the permittee will be authorized to continue the use of the water additive at the level specified in the application.

If, upon review of the above demonstration, it is determined by the Detroit District Supervisor that the effluent limitation is being exceeded, the permittee will be so notified. The permittee shall achieve compliance with the effluent limitation within three months of such notification.

PART I

Section A.

10. Special Condition - BAT Monitoring

As a condition of this permit, the permittee shall monitor the discharge from outfall 001 for the constituents listed below using approved test procedures established by the federal regulations "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act", 40 CFR Part 136. This monitoring is designed to determine whether these constituents are discharged and, therefore require effluent limitations under the federal regulations entitled "Organic Chemicals and Plastics and Synthetic Fibers Category Effluent Limitations Guidelines", 40 CFR Parts 414 and 416. Grab samples and 24 hour composite samples shall be taken once per year, for the life of this permit. The grab samples shall be analyzed for the volatile compounds and 24 hour composite samples shall be analyzed for non-volatile compounds. The results of the analysis of such monitoring shall be submitted to the Chief of the Surface Water Quality Division in accordance with Part I.C.3., Schedule of Compliance. If, upon review of the analysis, it is determined that any of the materials or constituents require limiting in accordance with applicable water quality or technology standards, the permit may then be modified after public notice and Commission approval of the recommended permit modification in accordance with Part II.B.4. The reissuance of this permit does not authorize the discharge in quantities exceeding the levels established in 40 CFR Parts 414 and 416 or Michigan Water Quality Standards for any of the constituents listed below:

Volatile Compounds

acrylonitrile	benzene	carbon tetrachloride
chlorobenzene	chloroethane	chloroform
1,1-dichloroethane	1,2-dichloroethane	1,1-dichloroethylene
1,2-dichloropropane	1,3-dichloropropylene	ethylbenzene
methyl chloride	methylene chloride	tetrachloroethylene
1,2-trans-dichloroethylene	1,1,1-trichloroethane	vinyl chloride
1,1,2-trichloroethane		

Acid Compounds

2,4-dimethylphenol	4,6-dinitro-o-cresol	2,4-dinitrophenol
2-nitrophenol	4-nitrophenol	phenol

Base/Neutral Compounds

acenaphthene	acenaphtylene	anthracene
benzo(a)anthracene	benzo(a)pyrene	3,4-benzofluoranthene
benzo(k)fluoranthene	bis(2-chloroisopropyl)ether	bis(2-ethylhexyl)phthalate
chrysene	1,2-dichlorobenzene	1,3-dichlorobenzene
1,4-dichlorobenzene	diethyl phthalate	dimethyl phthalate
di-n-butyl phthalate	fluoranthene	fluorene
hexachlorobenzene	hexachlorobutadiene	hexachloroethane
naphthalene	nitrobenzene	phenanthrene
pyrene	1,2,4-trichlorobenzene	

Other Toxic Pollutants

Total Chromium	Total Copper	Total Cyanide
Total Nickel	Total Zinc	

PART I

B. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting:

a. DMR Submittal Requirements - The permittee shall submit Discharge Monitoring Report (DMR) forms to the Michigan Department of Natural Resources, Surface Water Quality Division, Data Entry Unit, P.O. Box 302738, Lansing, Michigan, 48909, for each calendar month of the authorized discharge period(s). The DMRs shall be postmarked no later than the 10th day of the month following each month of the authorized discharge period(s).

3. Definitions

a. The monthly average discharge is defined as the total discharge by weight, or concentration if specified, during the reporting month divided by the number of days in the reporting month that the discharge from the production or commercial facility occurred. If the pollutant concentration in any sample is less than the detection limit, regard that value as zero when calculating monthly average concentration. When less than daily sampling occurs, the monthly average discharge shall be determined by the summation of the measured daily discharges by weight, or concentration if specified, divided by the number of days during the reporting month when the samples were collected, analyzed and reported.

b. The daily maximum discharge means the total discharge by weight, or concentration if specified, during any calendar day.

c. The Regional Administrator is defined as the Region V Administrator, U.S. EPA, located at R-16J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

d. The Executive Secretary of the Michigan Water Resources Commission is located in the KNAPP'S OFFICE CENTRE. The mailing address is P.O. Box 30273, Lansing, Michigan, 48909.

e. The Chief of the Surface Water Quality Division's mailing address is P.O. Box 30273, Lansing, Michigan, 48909.

4. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(h) of the Act, under which such procedures may be required.

PART I

Section B.

5. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of measurement or sampling;

b. The person(s) who performed the measurement or sample collection;

c. The dates the analyses were performed;

d. The person(s) who performed the analyses;

e. The analytical techniques or methods used;

f. The date of and person responsible for equipment calibration; and

g. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Michigan Water Resources Commission.

PART I

C. SCHEDULE OF COMPLIANCE

1. The permittee shall continue to operate the installed facilities to achieve the effluent limitations specified for outfalls 001, 002 and 003.

2. If the discharges authorized by this permit are expected to continue beyond the expiration date of this permit, the permittee is required to submit an application for reissuance to the Chief of the Permits Section of the Surface Water Quality Division on or before April 1, 1997.

3. On or before March 1st of each year, during the effectiveness of this permit, the permittee shall submit the analytical results required in the BAT Monitoring Special Condition, Part I.A.10., of this permit. The analytical results shall be submitted to the Chief of the Surface Water Quality Division.

4. Written Notification Required

Within 14 days of every requirement date specified in this permit, the permittee shall submit a written notification to the Detroit District Supervisor of the Surface Water Quality Division indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

PART II

A. MANAGEMENT REQUIREMENTS

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of Public Acts 245, of 1929, as amended, and/or PL 92-500, as amended, and constitutes grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of an application for permit renewal.

2. Change of Conditions

Any anticipated facility expansion, production increases, or process modification which will result in new, different, or increased discharges of pollutants must be reported by submission of a new application to the Chief of the Permits Section of the Surface Water Quality Division or, if such changes will not violate the effluent limitations specified in this permit, by notice to the Detroit District Supervisor of the Surface Water Quality Division. Following such notice, the permit may be modified to specify and limit any pollutant not previously limited.

3. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of concentrated solutions, acids, alkalies, salts, oils, or other polluting materials in accordance with the requirements of the Michigan Water Resources Commission Rules, Part 5. This requirement is included pursuant to Section 5 of the Michigan Water Resources Commission Act 245, P.A. of 1929, as amended, and the Part 5 Rules of the General Rules of the Commission.

4. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified by the Michigan Department of Natural Resources, as required by Section 6a of the Michigan Act.

5. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Detroit District Supervisor of the Surface Water Quality Division with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

PART II

Section A.

6. Spill Notification

The permittee shall immediately report any spill or loss of any product, by-product, intermediate product, oils, solvents, waste material, or any other polluting substance which occurs to the surface waters or groundwaters of the state by calling the Department of Natural Resources 24-hour Emergency Response telephone number, 1-800-292-4706 (calls from out-of-state dial 1-517-373-8166); and within ten (10) days of the spill or loss, the permittee shall submit to the Detroit District Supervisor of the Surface Water Quality Division a full written explanation as to the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken, and schedule of implementation. This requirement is included pursuant to Section 5 of the Michigan Water Resources Commission Act 245, P.A. of 1929, as amended.

7. Facility Operation

The permittee shall at all times properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

8. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the surface or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

9. By-Passing

Any diversion from or by-pass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (a) where unavoidable to prevent loss of life, personal injury, or severe property damage, or (b) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Detroit District Supervisor of the Surface Water Quality Division and the Regional Administrator, in writing, of such diversion or by-pass.

10. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. Provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit which provision shall be indicated in this permit by inclusion of a specific compliance date in each appropriate "Schedule of Compliance for Effluent Limitations".

b. Upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

PART II

Section A.

11. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed from or resulting from treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters, or the entry of toxic or harmful contaminants thereof onto the groundwaters in concentrations or amounts detrimental to the groundwater resource.

12. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset shall notify the Detroit District Supervisor of the Surface Water Quality Division by telephone within 24 hours of becoming aware of such conditions and within five (5) days, provide in writing, the following information:

a. That an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. That the permitted wastewater treatment facility was, at the time, being properly operated;

c. That the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

In any enforcement proceedings the permittee, seeking to establish the occurrence of an upset, has the burden of proof.

13. Any requirement of this permit which is included under the unique terms of the Water Resources Commission, Act 245, P.A. of 1929, as amended, and rules promulgated thereunder, is not enforceable under the Federal Clean Water Act regulations.

PART II

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the Executive Secretary of the Michigan Water Resources Commission, the Regional Administrator and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Detroit District Supervisor of the Surface Water Quality Division and the Regional Administrator.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Act and Rule 2128 of the Water Resources Commission Rules, Part 21, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State Water Pollution Control Agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act and Sections 7 and 10 of the Michigan Act.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully, all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

PART II

Section B.

5. Toxic Pollutants

Notwithstanding Part II.B.4. above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "By-Passing" (Part II.A.9., pursuant to 40 CFR 122.41(m)) and "Upset" (Part II.A.12., pursuant to 40 CFR 122.41(n)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond his control, such as accidents, equipment breakdowns, or labor disputes.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Act except as are exempted by federal regulations.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any Federal, State or local laws or regulations, nor does it obviate the necessity of obtaining such permits or approvals from other units of government as may be required by law.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, if held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Notice to Public Utilities (Miss Dig)

The issuance of this permit does not exempt the permittee from giving notice to public utilities and complying with each of the requirements of Act 53 of the Public Acts of 1974, being sections 460.701 to 460.718 of the Michigan Compiled Laws, when constructing facilities to meet the terms of this permit.

APPENDIX F

EXHIBIT 2

NPDES Excursions Since 1985

Month	Parameter	Type Of Limit(s)	Annual Total
03/85	pH	1 daily	1
01/88	TOC	1 daily, 1 hourly	5
10/88	toluene	1 daily, 1 monthly	
11/88	toluene	1 monthly	
04/89	BOD	1 monthly	13
06/89	BOD	1 monthly	
07/89	BOD	2 daily, 1 monthly	
08/89	BOD TSS	3 daily, 1 monthly 2 daily	
10/89	BOD pH	1 monthly 1 daily	
02/90	toluene	1 daily, 1 monthly	3
03/90	toluene	1 daily	
06/92	toluene	1 daily	9
08/92	bis(2-chloroisopropyl)ether	1 daily	
09/92	bis(2-chloroisopropyl)ether	7 dailies	
12/93	bis(2-chloroisopropyl)ether	1 monthly	1
01/94	BOD bis(2-chloroisopropyl)ether	1 monthly 1 monthly	3
03/94	TOC	1 daily	

There were no excursions during 1986, 1987 and 1991.

APPENDIX F

EXHIBIT 3

WQ
1977?

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES COMMISSION

IN THE MATTER OF

BASF Wyandotte Corporation
South Works

NPDES PERMIT NO. MI [illegible]

WRC NO.: NC-9-77-04-2551

NOTICE OF NONCOMPLIANCE AND ORDER TO COMPLY

TO: BASF Wyandotte Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48192

Attn: Mr. W. J. Leisten, Manager, Environmental Control

PLEASE BE ADVISED that we have sufficient information to believe that your facility has failed to comply with the terms and conditions of your National Pollutant Discharge Elimination System Permit issued on December 19, 1974.

? SW NW ?

PURSUANT to the terms of the aforementioned permit (Part I, Section A.6), any discharge from your facility is limited to the following for Outfall 003:

Effluent Characteristics	Discharge Limitations lbs/day Daily Average	lbs/day Daily Maximum	mg/l Daily Average	mg/l Daily Maximum
Total Suspended Solids	5921 (net)	10,362 (net)	20 (net)	35 (net)
Total Chlorine Residual	----	---	--	.5
Total Lead	1.63	3.25	--	--
pH	Shall not be less than 6.5 nor greater than 9.5			

The monthly monitoring reports submitted for the months of June and July, 1977, show that your facility exceeded its authorized discharge limits according to the following:

Date Sampled	Effluent Characteristics	Reported Value
6/3/77	Total Suspended Solids	47 mg/l (net)
6/4/77	Total Suspended Solids	58 mg/l (net)
6/5/77	Total Suspended Solids	56 mg/l (net)
6/6/77	Total Suspended Solids	47 mg/l (net)
6/7/77	Total Suspended Solids	58 mg/l (net)
6/9/77	Total Suspended Solids	36 mg/l (net)
6/10/77	Total Suspended Solids	62 mg/l (net)
6/11/77	Total Suspended Solids	55 mg/l (net)
6/14/77	Total Suspended Solids	43 mg/l (net)
6/16/77	Total Suspended Solids	42 mg/l (net)
6/17/77	Total Suspended Solids	49 mg/l (net)
6/18/77	Total Suspended Solids	42 mg/l (net)
6/19/77	Total Suspended Solids	39 mg/l (net)
6/3/77	Total Suspended Solids	12,098 lbs/day (net)
6/4/77	Total Suspended Solids	15,702 lbs/day (net)
6/5/77	Total Suspended Solids	15,860 lbs/day (net)
6/6/77	Total Suspended Solids	12,920 lbs/day (net)
6/7/77	Total Suspended Solids	15,944 lbs/day (net)
6/10/77	Total Suspended Solids	16,527 lbs/day (net)
6/11/77	Total Suspended Solids	14,661 lbs/day (net)
6/14/77	Total Suspended Solids	10,925 lbs/day (net)
6/17/77	Total Suspended Solids	12,694 lbs/day (net)
6/18/77	Total Suspended Solids	10,671 lbs/day (net)
6/19/77	Total Suspended Solids	10,721 lbs/day (net)

Date Sampled	Effluent Characteristics	Daily Average	High	Low
6/1/77	Total Chlorine Residual	3.1 mg/l	3.7 mg/l	[illegible] mg/l
6/2/77	Total Chlorine Residual	1.7 mg/l	2.9 mg/l	.7 mg/l
6/3/77	Total Chlorine Residual	1.5 mg/l	2.5 mg/l	.8 mg/l
6/4/77	Total Chlorine Residual	3.7 mg/l	5.0 mg/l	2.0 mg/l
6/5/77	Total Chlorine Residual	2.6 mg/l	3.4 mg/l	1.2 mg/l
6/6/77	Total Chlorine Residual	2.1 mg/l	2.7 mg/l	1.2 mg/l
6/7/77	Total Chlorine Residual	4.8 mg/l	7.7 mg/l	3.2 mg/l
6/8/77	Total Chlorine Residual	4.2 mg/l	8.9 mg/l	1.6 mg/l
6/9/77	Total Chlorine Residual	1.0 mg/l	1.2 mg/l	.8 mg/l
6/10/77	Total Chlorine Residual	1.3 mg/l	1.5 mg/l	1.0 mg/l
6/11/77	Total Chlorine Residual	4.4 mg/l	8.0 mg/l	2.3 mg/l
6/12/77	Total Chlorine Residual	3.8 mg/l	4.6 mg/l	2.9 mg/l
6/13/77	Total Chlorine Residual	7.1 mg/l	8.8 mg/l	5.3 mg/l
6/14/77	Total Chlorine Residual	5.0 mg/l	5.1 mg/l	4.9 mg/l
6/15/77	Total Chlorine Residual	5.4 mg/l	5.8 mg/l	4.9 mg/l
6/16/77	Total Chlorine Residual	4.9 mg/l	5.3 mg/l	4.9 mg/l
6/17/77	Total Chlorine Residual	5.2 mg/l	7.6 mg/l	3.5 mg/l
6/18/77	Total Chlorine Residual	3.9 mg/l	4.1 mg/l	3.8 mg/l
6/19/77	Total Chlorine Residual	4.9 mg/l	5.6 mg/l	4.4 mg/l
6/20/77	Total Chlorine Residual	3.9 mg/l	5.8 mg/l	2.8 mg/l
6/21/77	Total Chlorine Residual	2.9 mg/l	3.7 mg/l	2.0 mg/l
6/22/77	Total Chlorine Residual	1.2 mg/l	2.8 mg/l	*
6/23/77	Total Chlorine Residual	*	.6 mg/l	*
6/24/77	Total Chlorine Residual	.57 mg/l	1.1 mg/l	*
6/25/77	Total Chlorine Residual	*	.9 mg/l	*
6/26/77	Total Chlorine Residual	.6 mg/l	1.0 mg/l	*
6/27/77	Total Chlorine Residual	.63 mg/l	1.0 mg/l	*
6/28/77	Total Chlorine Residual	.6 mg/l	*	*
6/29/77	Total Chlorine Residual	1.0 mg/l	2.0 mg/l	*

* = within limitation

Date Sampled	Effluent Characteristics	Reported Value
6/1/77	Total Lead	6 lbs/day
6/2/77	Total Lead	5 lbs/day
6/4/77	Total Lead	4 lbs/day
6/5/77	Total Lead	4 lbs/day
6/7/77	Total Lead	9 lbs/day
6/9/77	Total Lead	7 lbs/day
6/10/77	Total Lead	4 lbs/day
6/13/77	Total Lead	7 lbs/day
6/14/77	Total Lead	4 lbs/day
6/17/77	Total Lead	12 lbs/day
6/18/77	Total Lead	5 lbs/day
6/21/77	Total Lead	4 lbs/day
6/24/77	Total Lead	4 lbs/day
6/25/77	Total Lead	4 lbs/day
6/26/77	Total Lead	4 lbs/day
6/27/77	Total Lead	4 lbs/day
6/28/77	Total Lead	4 lbs/day
6/1/77	pH	11.5
6/2/77	pH	11.7
6/3/77	pH	11.8
6/4/77	pH	11.9
6/4/77	pH	10.5
6/5/77	pH	12.0
6/5/77	pH	11.0
6/6/77	pH	12.1
6/6/77	pH	10.8
6/7/77	pH	12.0
6/8/77	pH	12.0
6/8/77	pH	11.0
6/9/77	pH	11.8
6/10/77	pH	10.8
6/11/77	pH	11.2
6/12/77	pH	10.8
6/13/77	pH	12.1
6/13/77	pH	10.1

Date Sampled (Con't.)	Effluent Characteristics	Reported Value
6/14/77	pH	12.0
6/14/77	pH	10.1
6/15/77	pH	11.5
6/16/77	pH	10.0
6/16/77	pH	9.6
6/21/77	pH	10.4
6/22/77	pH	10.2
6/24/77	pH	11.2
6/25/77	pH	12.2
6/25/77	pH	10.5
6/26/77	pH	11.8
6/26/77	pH	10.1
6/27/77	pH	11.0
6/27/77	pH	10.1
6/28/77	pH	11.7
6/29/77	pH	10.2
6/30/77	pH	10.4
6/30/77	pH	4.8
7/1/77	pH	10.6
7/1/77	pH	2.9
7/2/77	pH	10.9
7/3/77	pH	11.2
7/3/77	pH	3.0
7/4/77	pH	6.3
7/5/77	pH	10.3
7/6/77	pH	11.7
7/7/77	pH	6.4
7/8/77	pH	10.5
7/8/77	pH	4.1
7/9/77	pH	9.6
7/10/77	pH	6.1
7/11/77	pH	10.6
7/11/77	pH	6.3
7/12/77	pH	10.3
7/12/77	pH	6.2
7/13/77	pH	12.0
7/14/77	pH	10.6
7/14/77	pH	6.0
7/15/77	pH	10.5
7/15/77	pH	6.0
7/16/77	pH	6.0
7/17/77	pH	10.3
7/17/77	pH	6.0
7/18/77	pH	10.0
7/19/77	pH	9.8
7/20/77	pH	10.7
7/20/77	pH	6.0
7/21/77	pH	10.6
7/21/77	pH	6.0
7/22/77	pH	10.5
7/22/77	pH	6.0
7/23/77	pH	6.3
7/24/77	pH	11.0
7/25/77	pH	10.3
7/25/77	pH	6.0
7/26/77	pH	11.4
7/26/77	pH	6.0
7/27/77	pH	11.2
7/27/77	pH	6.0
7/28/77	pH	10.4
7/29/77	pH	10.0
7/30/77	pH	9.7
7/31/77	pH	10.8
7/31/77	pH	6.0

Report Date	Effluent Characteristics	Reported Average
June, 1977	Total Suspended Solids	28 mg/l (net)
June, 1977	Total Suspended Solids	7,356 lbs/day (net)
June, 1977	Total Lead	4 lbs/day

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES COMMISSION

IN THE MATTER OF:

NPDES PERMIT NO: MI0000540
NNC No. NC-05-90-12-008D

BASF Corporation
Wyandotte, Michigan

NOTICE OF NONCOMPLIANCE

TO: BASF Corporation
1609 Biddle Avenue
Wyandotte, Michigan 48193

Attention: Mr. Dale Roush, Manager of Quality and Ecology Services Department

BE ADVISED that we have sufficient information to believe that your facility has failed to comply with the terms and conditions of their National Pollutant Discharge Elimination System (NPDES) Permit No. MI0000540 reissued September 15, 1988, and modified September 21, 1989.

PURSUANT to the terms of the NPDES Permit for your facility (Part I, Section A.1 Effluent Limitations and Monitoring Requirements), the discharge from your facility, to the Detroit River via outfall 001, is limited for the following parameter:

	Discharge Limitations	
Effluent Characteristics	Monthly Average	Daily Maximum
Toluene	0.49 lbs/d	1.3 lbs/d

copy
CWA
EJK
DPT
DCF
5/7/90

MAY - 3 1990

FURTHER, PURSUANT to the terms of the aforementioned permit (Part II, Section A.1 Duty to Comply) all discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than, or at a level in excess of that authorized, shall constitute a violation of the permit.

BE ADVISED that the BASF Corporation, Chemical Division had violations of their NPDES Permit as indicated in your facility's Discharge Monitoring Reports. The violations are as follows:

Date	Parameter	Daily Maximum	Monthly Average
February, 1990	Toluene	---	0.86 lbs/d
Feb. 27, 1990	Toluene	1.78 lbs/d	---
March 6, 1990	Toluene	3.22 lbs/d	---

FURTHER, BE ADVISED that the Company has notified the Department of each exceedance within five working days. The notification letters indicated that the Company has scheduled a survey of the plant area using a soil gas analysis technique to identify the extent of toluene contamination of the soil on April 9, 1990. It is our understanding that the survey has been completed.

IT IS THEREFORE DIRECTED that the Permittee immediately but by no later than May 15, 1990 obtain compliance with the terms and conditions of their NPDES permit requirements.

FURTHER, IT IS DIRECTED that the Permittee submit a written report to the Detroit District Office, Surface Water Quality Division as soon as possible but no later than May 30, 1990. This report must include:

1) Results of the soil survey.

2) An explanation of the steps that will be implemented to prevent future NPDES Permit violations including a proposed schedule of implementation.

FURTHER, IT IS DIRECTED that, on or before May 15, 1990, in addition to the NPDES permit monitoring requirements for toluene the permittee shall begin monitoring for toluene once each rain storm event at outfall 001 until the corrective actions are implemented. Said sample shall be a single grab sample collected within two hours of the end of the rain event.

PLEASE BE ADVISED that further administrative remedies will be instituted for continued failure to comply with the terms of your NPDES permit or this notice.

FURTHER, BE ADVISED that compliance with the terms of this notice does not relieve the Company of any liability, past or present, that results from the Company's failure to fully meet the conditions contained in NPDES Permit No. MI0000540, reissued September 15, 1988 and modified September 21, 1989.

WATER RESOURCES COMMISSION
DEPARTMENT OF NATURAL RESOURCES

Date Issued: May 1, 1990

Roy E. Schrameck

Roy E. Schrameck, Supervisor
Surface Water Quality Division
Detroit District Office

ADDRESS FOR FURTHER CORRESPONDENCE

Hae-Jin Yoon

Hae-Jin Yoon
Environmental Quality Analyst
Surface Water Quality Division
Detroit District Office
Northville, Michigan 48167
313-344-9460

cc: Frank Baldwin/Val Harris, Compliance and Enforcement Section
Permits Section
File

APPENDIX F

EXHIBIT 4

TABLE 1

USEPA LABORATORY RESULTS
BASF WYANDOTTE CORP. STUDY
September 8-9, 1980

Summary of Organic Results µg/1

Parameter/Date	outfall 001 9/8-9/80	003 9/8-9/80	Storm sewer WYE 9/9/80	Detroit River 9/8-9/80
Volatiles				
Methylene Chloride	71,100,100	-	-	53-190(5)
Chloroform	2	50	21	31,33,21(F)
Dichlorobromomethane	-	-	-	6.8, 5.6, 5.0 (F)
Trichlorofluoromethane	20,16	-	-	-
1,2-Dichloroethene	2.4,2.9	-	-	2.38(R)
1,2-Dichloropropane	-	200,80,550	-	-
Trichloroethane	-	-	-	92(R)
Dibromochloromethane	-	-	-	3.1,2.8,2.8(F)
Dichloroethane	-	-	-	-
Ether	-	-	-	7.1(R)
Cyclohexane	43	-	-	-
Methycyclopentane	60	-	-	-
Acetone	-	-	-	5.0(F)
Pesticides				
PCB-1254	-	-	-	.6(R),1.1(F)
Nonvolatiles				
Bis(2-Chloroethyl)Ether	-	-	73.8	-
Dichloropropene (Isomer)	-	-	23.9	-
Unknown (#58)	-	-	1.5	-
Bis (2-Chloroisopropyl)Ether	-	-	239.4	-

Remarks: ( ) Volatiles based on grabs - 3 samples for 001, 003; 1 sample WYE; 9 samples Detroit River - 6 samples RAW and 3 FIN (Wyandotte Water Supply). All other parameters were single sample (composite or grab)
(R)= RAW; (F)= FIN; (5) total # of samples in range

ERG LABORATORY RESULTS
BASF WYANDOTTE CORP. STUDY
1979 STUDY

Compound*	Concentration (ppb)
001N	
Propanenitrile, 2 Methyl	11.2
Propanoic Acid-2 Hydroxy-2Methly Methyl Ester	8.7
1-Propanol,3,3´-/1,3-Propanedicyclobis (OXY)/Bis (411)	16.0
1-Propanol, 3,3´/1,3-Propanedicyclobis (OXY)/Bis (502)	19.0
2-Methyl Hexanol	16.0
2-Propanol, 1-/2-(2-Methoxy-1-Methyl-Ethoxy)-1-Methylethoxy/	11.8
Aromatic Chlorinated Hydrocarbon (M.W. 298)	76
003N	
Bis (2-Chloroisopropyl) Ether	17700
Tridecatriene Nitrile, 4, 8, 12-Trimethyl	22.0
003N (Field Duplicate)	
Propane, 2,2,' - Oxybis/1-Chloro	4550
WYE	
1,1-Oxybis-3-Chloropropane	2620
1-3 Dichloro 1-Propene	21

* Listing does not include Phthalate esters found.
Phthalates were found in blanks.
Phthalates were also found in the Detroit River samples.

APPENDIX F

EXHIBIT 5

10/14/81

Survey Procedure

The flows and samples were obtained as follows:

Outfall	Flow Measurement	Sampling Methods
820407 South Intake	None	Submergible sampler, 4 aliquot grab composite + individual grabs.
North Intake	None	Submergible sampler, 4 aliquot grab composite + individual grabs.
820180 (001)	Company split sheet.	4 aliquot grab composite + individual grabs.
820178 (003)	Instantaneous measurements. Manning's Pipe Flow Formula.	Automatic air activated sampler, 4 aliquot grab composite + individual grabs.
Ash Pond Discharge	None	Individual grabs.
Wyandotte Water Plant Raw + Finished Water	None	Individual grabs.

An automatic sampler composites samples at timed intervals. Samples may be proportional to the instantaneous flow over the weir or through the flume.

A submergible sampler obtains samples at a continuous rate.

Extractable organic and sulfide composite samples are collected by the grab composite method.

A grab composite consists of a series of individual grabs composited into one sample.

An individual grab is a single instantaneous sample.

Samples were analyzed by the Environmental Protection Bureau Laboratories located in Lansing.

Samples were preserved according to Table 6. The results of the physical, chemical and bacteriological analyses are presented in Tables 1 & 2. Letter codes for laboratory results are defined in Table 6.

1981

BASF Wyandotte - North Works

Table 1 Analyses of composite samples.

Outfalls	820407 - South Intake	North Intake
Survey Period From	6-22-81 - 1420	6-22-81 - 1630
To	6-23-81 - 1420	6-23-81 - 1630
	mg/l	mg/l
COD	6	8
TOC	3.1	3.0
Phenol	0.005 NA	0.005 NA
Cyanide (Total)	< 0.005	< 0.005
Cyanide (Free)	< 0.005	< 0.005
Sulfide	< 0.02	< 0.02
BOD_5	4.2	2.9
Nitrite & nitrate nitrogen-N	0.33	0.31
Ammonia nitrogen-N	0.30	0.33
Kjeldahl nitrogen-N	0.66	0.63
Total phosphorus-P	0.07	0.06
Hexavalent chromium (Cr^{+6})	< 0.002	< 0.002
Chlorides	13.1	13.5
MBAS	0.02 HT	0.02 HT
Suspended solids	12	11
Dissolved solids	160	160
	ug/l	ug/l
Total cadmium (Cd)	< 20	< 20
Total chromium (Cr)	< 50	< 50
Total copper (Cu)	< 20	< 20
Total nickel (Ni)	< 50	< 50
Total lead (Pb)	< 50	< 50
Total zinc (Zn)	< 50	< 50
Total iron (Fe)	600	270
Total mercury (Hg)	< 1	< 1
PCB 1242	< 0.1	--
PCB 1254	< 0.1	
PCB 1260	< 0.1	
Other Polychlorinated Biphenols	U	

BASF Wyandotte - North Works

Table 1 (continued)

Outfalls.	820180 (001)		820178 (003)	
Survey Period From	6-22-81 - 1600		6-22-81 - 1525	
To	6-23-81 - 1600		6-23-81 - 1525	
Computed flow rate[1] (M^3/day)	(23,000)		9,770	
	mg/l	kg/day	mg/l	kg/day
COD	97	2,200	180	1,760
TOC	31	710	54	530
Phenol	0.017 NA	0.39	0.045 NA	0.44
Cyanide (Total)	0.009	0.2	0.048	0.47
Cyanide (Free)	< 0.009	--	< 0.048	--
Sulfide	< 0.02 PS	--	< 0.02 PS	--
BOD_5	24	550	32.	310
Nitrite & nitrate nitrogen-N	0.31	7.1	0.45	4.4
Ammonia nitrogen-N	0.32	7.4	1.2	12
Kjeldahl nitrogen-N	1.3	30	7.7	75
Total phosphorus-P	0.09	2	0.19	1.9
Hexavalent chromium (Cr^{+6})	< 0.002	--	0.002	0.02
Chlorides	18.2	419	270	2,600
MBAS	0.02 HT	0.5	0.08 HT	0.8
Suspended solids	13	300	10	100
Dissolved solids	150	3,400	680	6,600
	ug/l		ug/l	
Total cadmium (Cd)	< 20	--	< 20	--
Total chromium (Cr)	< 50	--	< 50	--
Total copper (Cu)	< 20	--	< 20	--
Total nickel (Ni)	< 50	--	< 50	--
Total lead (Pb)	< 50	--	< 50	--
Total zinc (Zn)	< 50	--	< 50	--
Total iron (Fe)	580	13	990	9.7
Total mercury (Hg)	< 1	--	1	0.01

1 - Flow rates used in the computation of kg/day (obtained from company split sheet).
To obtain MGD multiply M^3/day by 0.0002642
To obtain lbs/day multiply kg/day by 2.205

BASF Wyandotte - North Works

Table 2 Analyses of grab samples.

Date	Time	Flow[1] M3/day	Temp.[1] °C	pH[1] S.U.	Residual[1] Chlorine mg/l	COD mg/l	TOC mg/l	Phenol mg/l	BOD_5 mg/l	Nitrite & nitrate nitrogen mg/l	Ammonia nitrogen mg/l	Kjeldah nitrogen mg/l
820407 South Intake												
6-22-81	2200	--	19.5	7.6	U	7	3.0	0.005 NA	3.3	0.34	0.25	0.62
6-23-81	0745	--	19.5	7.5	U	7	3.0	0.005 NA	3.2	0.29	0.34	0.77
North Intake												
6-22-81	2330	--	19.5	7.8	U	6	3.5	0.004 NA	2.7	0.30	0.31	0.62
6-23-81	0915	--	19.5	7.2	U	8	3.5	0.005 NA	3.2	0.28	0.34	0.73
820180 (001)												
6-22-81	1610	--	22.0	7.4	U	58	14	0.006 NA	8.0	0.37	0.29	1.3
6-22-81	2315	--	23.0	7.5	U	42	14	0.011 NA	12.	0.33	0.27	0.87
6-23-81	0850	--	24.0	7.2	U	420	110	0.03 NA	78.	0.28	0.43	1.8
820178 (003)												
6-22-81	2240	5,300	23.0	7.3	U	290	76	0.16 NA	51.	0.46	1.3	9.5
6-23-81	0815	10,000	21.0	7.1	U	300	83	0.029 NA	11.	0.46	0.95	2.6
6-23-81	1215	12,000	25.5	7.0	U	120	37	0.022 NA	16.	0.40	0.84	2.1
Ash Pond Discharge												
6-23-81	1245	--	24.0	7.6	U	6	3.8	0.005 NA	3.0	0.36	0.26	0.58
6-23-81	1650	--	25.0	7.8	U	12	4.3	0.005 NA	2.1	0.36	0.24	0.53
Wyandotte Water Plant - Raw Water												
6-23-81	0945	--	19.5	7.8	U	9	4.7	0.002 NA	2.4	0.28	0.08	0.33
6-23-81	1400	--	20.0	8.0	U	4	3.1	0.003 NA	2.1	0.28	0.06	0.30
Wyandotte Water Plant - Finished Water												
6-23-81	0945	--	20.0	7.5	0.75	< 3	2.4	0.002 NA	2.0	0.29	0.02	0.13
6-23-81	1400	--	20.0	7.6	0.70	< 3	2.4	0.002 NA	2.0	0.30	0.02	0.13

1 - Values determined in the field at time of sampling.

BASF Wyandotte - North Works

Table 2 (continued)

Date	Time	Total phosphorus-P mg/l	Chloride mg/l	MBAS mg/l	Susp. solids mg/l	Diss. solids mg/l	O&G I.R. mg/l	O&G Grav. mg/l	Petroleum Hydrocarbons (silica gel) mg/l	Total[2] Aliphatic Amines ug/l	[illegible] (as [illegible]) ug/l
820407 South Intake											
6-22-81	2200	0.07	12.9	--	5	140	7	2	4	< 100	< 100
6-23-81	0745	0.08	13.9	--	8	120	1	< 2	5	< 100	< 100
North Intake											
6-22-81	2330	0.05	12.8	--	4	160	< 1	< 2	< 1	< 100	< 100
6-23-81	0915	0.07	13.0	--	< 4	140	< 1	< 2	< 1	< 100	< 100
820180 (001)											
6-22-81	1610	0.09	21.	--	15	140	14	6	11	220	< 100
6-22-81	2315	0.06	16.	--	8	140	1	< 2	< 1	130	< 100
6-23-81	0850	0.11	33.	--	16	180	11	15	4	240	< 100
820178 (003)											
6-22-81	2240	0.15	200	--	23	630	44	50	25	200	< 100
6-23-81	0815	0.23	510	--	23	1,200	38	68	25	460	< 100
6-23-81	1215	0.24	320	--	10	780	13	28	9	130	< 100
Ash Pond Discharge											
6-23-81	1245	0.13	14.9	--	< 4	92	< 1	< 2	< 1	< 100	< 100
6-23-81	1650	0.11	13.8	--	62	130	< 1	< 2	< 1	< 100	< 100
Wyandotte Water Plant - Raw Water											
6-23-81	0945	0.03	8.7	< 0.02 HT	5	150	< 1	< 2	--	--	< 100
6-23-81	1400	0.02	8.1	< 0.02 HT	8	150	< 1	< 2	--	--	< 100
Wyandotte Water Plant - Finished Water											
6-23-81	0945	< 0.01	10.3	< 0.02 HT	< 4	130	< 1	< 2	--	--	< 100
6-23-81	1400	< 0.01	10.5	< 0.02 HT	< 4	150	< 1	< 2	--	--	< 100

2 - Total aliphatic amines concentration is based upon a standard mixture of octa-decyl amine and di-octa-decyl amine. ASTM No. D 2327-80

BASF Wyandotte - North Works

Table 2 (continued)

Date	Time	Purgeable Halocarbons				Acrylo-nitrile ug/l	Bis (2-chloro-iso pro-pyl) ether ug/l
		Chloroform ug/l	1-2 Dichloro-ethane ug/l	1-2 Dichloro-propane ug/l	Others ug/l		
820407 South Intake							
6-22-81	2200	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	0745	< 10	< 10	< 10	U	< 1,000	NAV
North Intake							
6-22-81	2330	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	0915	< 10	< 10	< 10	U	< 1,000	NAV
820180 (001)							
6-22-81	1610	< 10	< 10	< 10	U	< 1,000	NAV
6-22-81	2315	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	0850	< 10	< 10	< 10	U	< 1,000	NAV
820178 (003)							
6-22-81	2240	< 10	< 10	680 LC	--	< 1,000	NAV
6-23-81	0815	< 10	120	1,400 LC	--	< 1,000	NAV
6-23-81	1215	< 10	39	1,200 LC	--	< 1,000	NAV
Ash Pond Discharge							
6-23-81	1245	< 10	< 10	< 10	U	< 1,000	NAV
6-23-81	1650	< 10	< 10	< 10	U	< 1,000	NAV
Wyandotte Water Plant - Raw Water							
6-23-81	0945	U	U	U	U	< 1,000	NAV
6-23-81	1400	U	U	U	U	< 1,000	NAV
Wyandotte Water Plant - Finished Water							
6-23-81	0945	U	U	U	U	< 1,000	NAV
6-23-81	1400	U	U	U	U	< 1,000	NAV

BASF Wyandotte - North Works

Table 2 (continued)

Date	Time	Benzene ug/l	Toluene ug/l	Xylene ug/l	Styrene ug/l	Ethylbenzene ug/l	Others ug/l
		Purgeable Aromatic Hydrocarbons					
820407 South Intake							
6-22-81	2200	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0745	< 10	< 10	< 10	< 10	< 10	U
North Intake							
6-22-81	2330	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0915	< 10	< 10	< 10	< 10	< 10	U
820180 (001)							
6-22-81	1610	< 10	< 10	< 10	< 10	< 10	U
6-22-81	2315	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0850	< 10	< 10	< 10	< 10	< 10	U
820178 (003)							
6-22-81	2240	< 10	< 10	< 10	< 10	< 10	U
6-23-81	0815	< 10	< 10	< 10	< 10	< 10	U
6-23-81	1215	< 10	< 10	< 10	< 10	< 10	U
Ash Pond Discharge							
6-23-81	1245	< 10	< 10	< 10	< 10	< 10	U
6-23-81	1650	< 10	< 10	< 10	< 10	< 10	U
Wyandotte Water Plant - Raw Water							
6-23-81	0945	U	U	U	U	U	U
6-23-81	1400	U	U	U	U	U	U
Wyandotte Water Plant - Finished Water							
6-23-81	0945	U	U	U	U	U	U
6-23-81	1400	U	U	U	U	U	U

BASF Wyandotte - North Works

Table 3 Comparison of survey results with the facility's NPDES Permit and Monthly Operating Report.

Parameter (Unit)	NPDES Permit Final Limitations		June Monthly Operating Report				Survey Results[1]
	Daily Average	Daily Maximum	Monthly Average	Monthly Maximum	6-22-81	6-23-81	
820180 (001)							
Flow (M^3/day)	--	--	21,000	26,000	23,000	23,000	23,000
Susp. sol.-net (mg/l)	20	60	1	22	6	0	1
(kg/day)	811	2434	20	341	138	0	23
BOD_5 (mg/l)	--	--	19	28	28	--	24 (8.0, 12., 78.)
COD (mg/l)	--	--	145	184	129	--	97 (58, 42, 420)
Chlorine residual (mg/l)	--	0.5	0	0	0	0	(U, U, U)
Total phosphorus-P (mg/l)	1.0	2.0	0.1	0.1	0.1	0	0.09 (0.09, 0.06,
(kg/day)	41	81	1.9	2.3	2.3	--	2
*Petroleum hydrocarbons (mg/l)	--	10	--	--	--	--	(11, <1, 4)
Chlorides (mg/l)	--	--	26	34	33	31	18.2 (21., 16., 33
Phenol (mg/l)	--	--	0.026	0.055	0.019	--	0.017 (0.006, 0.0 0.03)
pH (S.U.)	not <6.5 nor >9.5		--	9.1 min. 6.6	max. 7.5 min. 6.9	max. 7.0 min. 6.7	(7.4, 7.5, 7
820178 (003)							
Flow (M^3/day)	--	--	6,400	12,000	9,800	12,000	9,770
COD (low level) (mg/l)	--	--	104	172	172	--	180 (290, 300, 120)
Susp. sol.-net (mg/l)	20	60	4	35	2	35	0
(kg/day)	250	750	30	436	20	436	0
Chlorides (mg/l)	--	--	236	442	308	442	270 (200, 510, 320)
Chlorine Residual (mg/l)	--	0.5	0.0	0.0	0.0	0.0	(U, U, U)
Total phosphorus-P (mg/l)	1.0	2.0	0.1	0.2	0.2	--	0.19 (0.15, 0.23, 0.24)
(kg/day)	12.5	25	0.95	2.0	2.0	--	1.9
Phenol (mg/l)	--	--	0.015	0.027	0.01	--	0.045 (0.16, 0.02 0.022)
*Petroleum Hydrocarbons (mg/l)	--	10	0	2	0	2	(25, 25, 9)
Ammonia nitrogen-N (mg/l)	10	20	0.3	1.0	0.5	0.6	1.2 (1.3, 0.95, (
(kg/day)	62.5	125	2.2	7.48	4.90	7.48	12
pH (S.U.)	not <6.0 nor >8.0		--	7.9 min. 6.3	max. 7.2 min. 6.6	max. 7.9 min. 7.0	(7.3, 7.1, 7.
820407 (Intake)							
Susp. solids (mg/l)	--	--	16	28	14	15	12 (5, 8)
820314 All Outfalls							
Chlorides (kg/day)	585,000	--	2,048	6,225.6	3,786	6,225.6	--

1 - Survey results are for the composite sample. Grab sample ranges are shown in parentheses ( ).
* - Environmental Monitoring and Support Laboratory, U.S. EPA, Cincinnati, Ohio (July, 1975).
Net is defined as the difference between the discharge and intake values.
[illegible] M^3/day by 0.0002642 To obtain lbs/day multiply kg/day by 2.205

Table 4 Comparison of the laboratory analytical results obtained by BASF Wyandotte - North Works and the Environmental Protection Bureau from the split composite sample and individual grabs.

Outfalls	820407 (South Intake)		820180 (001)	
	BASF mg/l	E.P.B. mg/l	BASF mg/l	E.P.B. mg/l
COD	--	--	129	97
BOD_5	--	--	28	24
Total phosphorus-P	--	--	0.1	0.09
Chlorides	--	--	33	18.2
Phenol	--	--	0.019	0.017
Suspended solids	13	12	15	13

Outfall	820178 (003)	
	BASF	E.P.B.
Flow (M^3/day)	5,700	9,770
	mg/l	mg/l
COD	172	180
Chloride	308	270
Phenol	0.010	0.045
Ammonia nitrogen-N	0.5	1.2
Total phosphorus-P	0.2	0.19
Suspended solids	50	10

BASF Wyandotte - North Works

Table 5 Comparison of the previous survey results with the results obtained in this survey.

Outfalls	820407 (South Intake)		820180 (001)	
Survey Date From	5-1-79	6-22-81	5-1-79	6-22-81
To	5-2-79	6-23-81	5-2-79	6-23-81
Flow Rate (M^3/day)	--	--	34,100	23,000
	mg/l	mg/l	mg/l	mg/l
COD	18	6	270	97
TOC	--	--	66	31
Phenol	0.010	0.005	0.24	0.017
Cyanide (Total)	0.01	< 0.005	0.01	0.009
Sulfide	--	--	< 0.05	< 0.02
BOD_5	--	--	48	24
Nitrite & nitrate nitrogen-N	0.42	0.33	0.44	0.31
Ammonia nitrogen-N	0.40	0.30	0.25	0.32
Total phosphorus-P	0.05	0.07	0.14	0.09
Chlorides	17.8	13.1	24	18.2
Suspended solids	14	12	16	13
Dissolved solids	160	160	190	150
	ug/l	ug/l	ug/l	ug/l
Total iron (Fe)	560	600	360	580

BASF Wyandotte - North Works

Table 5 (continued)

Outfall	820178 (003)	
Survey Date From	5-1-79	6-22-81
To	5-2-79	6-23-81
Flow Rate (M^3/day)	5,490	9,770
	mg/l	mg/l
COD	120	180
TOC	43	54
Phenol	0.36	0.045
Cyanide (Total)	0.03	0.048
Sulfide	< 0.05	< 0.02
BOD_5	87	32.
Nitrite & nitrate nitrogen-N	0.55	0.45
Ammonia nitrogen-N	0.75	1.2
Total phosphorus-P	0.13	0.19
Chlorides	330	270
Suspended solids	16	10
Dissolved solids	1,060	680
	ug/l	ug/l
Total iron (Fe)	1,100	990

Table 6 Sample Preservation

Parameter	Preservative
COD/TOC/Phenol (Chlorine Absent)	10 drops conc. H_2SO_4/250 ml (to pH <2).
Cyanide	Dechlorinate if needed with sodium thiosulfate (1 drop 0.141 N/mg/l Cl_2/250 ml. 10 drops 10 N NaOH (to pH ≥12)/250 ml.
Total Metals	2 ml 1:1 HNO_3/250 ml (to pH <2).
Oil & Grease	10 drops conc. H_2SO_4/250 ml (to pH <2).
Sulfides	10 drops 1M ZnAc/250 ml.
Acid & Base-neutral Extractables Puregable Organics	Dechlorinated (if needed) with sodium thiosulfate (1 drop 0.141 N/mg/l Cl_2/250 ml).

All samples cooled to 4°C and preserved upon collection and chain of custody maintained.

Lab Letter Codes

U - Material was analyzed for but not detected.
NA - Analytical method has not yet been approved by the laboratory.
PS - Possible interference may have effected the accuracy of the laboratory results.
HT - The recommended maximum laboratory holding time was exceeded before analysis.
NAV - Requested analysis not available.
LC - Laboratory conditions during analysis were not optimum.

Survey by: Martin Rock, Environmental Engineer
Elizabeth Browne, Water Quality Technician
Richard Irvin, Water Quality Technician

Contact with Management: H. Dale Roush, Manager - Environmental Protection, Health and Safety

Hydrocarbon Analyses by: Environmental Protection Bureau Laboratory

Physical, Chemical & Bacteriological Analyses by: Environmental [illegible]

Elizabeth Browne
Point Source Studies Section
Environmental Services Division
Environmental Protection Bureau
Michigan Dept. of Natural Resources

Distribution "A"
MM

10/14/81

APPENDIX F

EXHIBIT 6

6/22 · 6/25/81

Table 1 Fathead minnow mortality after exposure to various concentrations of BASF Wyandotte effluent from outfall 820180 (001). Polyol

Nominal Effluent Concentration %	Percent Mortality/Exposure Period								
	2 hours	7 hours	18 hours	24 hours	31 hours	41 hours	48 hours	72 hours	96 hours
100	100	--	--	--	--	--	--	--	100
88	100	--	--	--	--	--	--	--	100
75	70	85	85	100	--	--	--	--	100
66	80	80	80	100	--	--	--	--	100
50	0	5	5	10	10	20	20	30	35
33	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

96 hour LC50 = 53% effluent
approximate 95% confidence limits = 48 and 59% effluent

Table 2 Results of a 48-hour static *D. magna* toxicity test conducted with effluent from outfall 820180 (001) at BASF Wyandotte - 6/23-25/81.

Palyof

a. Biological Data

Nominal % Effluent	% immobilized at 24 hours	% immobilized at 48 hours
100	0	0
88	0	10
75	0	10
66	0	0
50	0	0
33	0	0
25	0	0
12	0	0
0 (control)	0	10

48-hour EC50: Cannot be determined - insufficient immobilization.

b. Chemical/Physical Data

Parameter	6/23/81 Control	6/23/81 50%	6/23/81 100%	6/25/81 Control	6/25/81 50%	6/25/81 100%
Dissolved oxygen (mg/l)	8.2	7.2	6.1	8.2	7.5	7.3
Oxygen saturation (%)	99	87	74	95	87	85
pH (S.U.)	8.1	8.0	7.9	8.2	8.0	7.9
Temperature (°C)	24	24	25	22	22	22
Conductivity (umhos)	226	240	247	226	239	246
Alkalinity (mg/l)	--	--	--	88	--	88
Hardness (mg/l)	--	--	--	100	--	100

Table 3 Results of a 48-hour static *D. magna* toxicity test conducted with effluent from outfall 820178 (003) at BASF Wyandotte - 6/23-25/81.

a. Biological Data

Nominal % Effluent	% immobilization at 24 hours	48 hours
100	0	10
75	0	0
50	0	0
25	0	0
10	0	0
0 (control)	0	0

48 hour EC50: Cannot be determined - insufficient immobilization.

b. Chemical/Physical Data

Parameter	6/23/81 Control	50%	100%	6/25/81 Control	50%	100%
Dissolved oxygen (mg/l)	8.4	8.5	8.6	8.5	8.3	8.2
Oxygen Saturation (%)	98	99	98	94	92	91
pH (S.U.)	7.8	7.8	7.8	8.2	8.2	8.2
Temperature (°C)	22	22	21	20	20	20
Conductivity (umhos)	234	796	1360	231	787	1330
Alkalinity (mg/l)	84		140	--		
Hardness (mg/l)	100		180	--		

Table 4 On-site analyses of effluent grab samples collected at BASF Wyandotte Corporation, outfall 001 during 6/22-26/81.

Date	Time	Temp.* (°C)	pH (S.U.)	Conductivity (umhos)	D.O. (mg/l)	Chlorine (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)
6-22-81	1400	23	7.6	597	4.8	Trace (1)	--	--
	1740	22	7.8	270	5.4	--	--	--
	2140	22	7.8	262	4.8	U (2)	88	110
6-23-81	0800	21	7.7	277	5.3	--	96	110
	1125	23	7.6	260	3.9	U	--	--
	1550	24	7.7	306	4.1	--	--	--
	2140	21	7.8	249	6.0	U	--	--
6-24-81	0740	22	7.7	251	4.9	U	--	--
	1140	22	7.7	251	5.5	--	100 (3)	110 (3)
	1540	23	7.7	309	3.7	--	--	--
	2130	22	7.2	301	3.2	--	--	--
6-25-81	0840	21	7.6	303	4.2	U	--	--
	1120	23	7.6	287	3.9	U	--	--
	1515	25	7.0	260	1.6	--	96	110
	2125	22	7.5	288	3.4	--	--	--
6-26-81	0840	22	7.6	321	2.9	U	88	100
	1140	23	7.8	240	4.4	--	--	--
	1405	23	7.9	250	4.5	--	--	--

* - After the heat exchanger
(1) - Trace: present in quantity << detection limit of 0.2 mg/l
(2) - U = undetected
(3) - Actual analyses performed at 1040

Table 5 On-site analyses of diluent (Detroit River) grab samples collected during 6/22-26/81.

Date	Time	Temp.* (°C)	pH (S.U.)	Conductivity (umhos)	D.O. (mg/l)	Chlorine (mg/l)	Alkalinity (mg/l)	Hardness (mg/l)
6-22-81	1400	22	7.9	244	7.4	Trace[1]	--	--
	1740	21	7.9	240	7.4	--	--	--
	2140	21	7.9	234	7.6	U[2]	84	110
6-23-81	0800	21	7.9	241	8.0	--	88	100
	1125	22	7.9	231	8.2	U	--	--
	1550	22	8.1	225	8.5	--	--	--
	2140	20	7.9	237	8.5	U	--	--
6-24-81	0740	20	7.7	238	8.4	Trace	--	--
	1140	21	7.9	231	8.5	--	84[3]	100[3]
	1540	21	7.9	229	8.4	--	--	--
	2130	20	7.9	233	8.6	--	--	--
6-25-81	0840	22	7.8	231	8.4	Trace	--	--
	1120	21	7.8	228	8.4	U	--	--
	1515	22	8.0	220	8.4	--	88	100
	2125	21	7.8	227	8.4	--	--	--
6-26-81	0840	20	7.9	226	8.4	U	88	100
	1140	21	8.0	225	8.3	--	--	--
	1405	21	7.9	225	8.3	--	--	--

* - After the heat exchanger
[1] - Trace = present in quantity << detection limit of 0.2 mg/l
[2] - U = undetected
[3] - Actual analyses performed at 1040

Table 6 Laboratory analyses of effluent composite samples collected from outfall 820180 (001) at BASF Wyandotte Corporation.

Sample Period From	6-22-81 - 1600		6-24-81 - 0815	
To	6-23-81 - 1600		6-25-81 - 0815	
Computed flow rate① (M^3/day)	23,000		25,000	
	mg/l	kg/day	mg/l	kg/day
Suspended solids	13	300	20	500
Dissolved solids	150	3,400	170	4,200
COD	97	2,200	180	4,500
TOC	31	710	34	850
Cyanide (Total)	0.009	0.2	--	--
Cyanide (Free)	< 0.009	--	--	--
Sulfide	< 0.02②	--	--	--
BOD5	24	550	15	380
Nitrite & nitrate nitrogen-N	0.31	7.1	--	--
Ammonia nitrogen-N	0.32	7.4	0.43	11.
Kjeldahl nitrogen-N	1.3	30.	1.0	25
Total phosphorus-P	0.09	2	0.06	2
Chlorides	18.2	419	19.3	482
MBAS	0.02③	0.5	--	--
	ug/l		ug/l	
Phenol	17④	0.39	8④	0.2
Total cadmium (Cd)	< 20	--	< 20	--
Total chromium (Cr)	< 50	--	< 50	--
Hexavalent chromium (Cr^{+6})	< 2	--	--	--
Total copper (Cu)	< 20	--	< 20	--
Total nickel (Ni)	< 50	--	< 50	--
Total lead (Pb)	< 50	--	< 50	--
Total zinc (Zn)	< 50	--	< 50	--
Total iron (Fe)	580	13	--	--
Total mercury (Hg)	< 1.	--	--	--
Polynuclear aromatic hydrocarbons	< 1	--	--	--
PCB 1242	< 0.1	--	--	--
PCB 1254	< 0.1	--	--	--
PCB 1260	< 0.1	--	--	--
Other PCB's & organochlorine pesticides	U⑤	--	--	--

① - Flow rates used in the computation of kg/day-obtained from company MOR.
② - Possible interference
③ - Maximum holding time was exceeded
④ - Analytical method not yet approved by laboratory
⑤ - U = undetected
To obtain MGD multiply M3/day by 0.0002642
To obtain lbs/day multiply kg/day by 2.205

Table 7 Laboratory analyses of effluent grab samples collected from outfall 820180 (001) at BASF Wyandotte Corporation.

Date	6-22-81	6-22-81	6-23-81	6-23-81 (1)	6-24-81	6-25-81
Time	1610	2315	0850	1135	2150	0805
	mg/l*	mg/l	mg/l	mg/l*	mg/l	mg/l
Suspended solids	15	8	16	--	--	--
Dissolved solids	140	140	180	--	--	--
COD	58	42	420	--	--	--
TOC	14	14	110	--	--	--
BOD_5	8.0	12.	78.	--	--	--
Chlorine Residual	U (2)	U	U	U	--	--
Nitrite & nitrate nitrogen-N	0.37	0.33	0.28	--	--	--
Ammonia nitrogen-N	0.29	0.27	0.43	--	--	--
Kjeldahl nitrogen-N	1.3	0.87	1.8	--	--	--
Total phosphorus-P	0.09	0.06	0.11	--	--	--
Chlorides	21.	16.	33.	--	--	--
Oil & Grease (Grav.)	6	< 2	15	--	--	--
Oil & Grease (I.R.)	14	1	11	--	--	--
Petroleum hydrocarbons	11	< 1	4	--	--	--
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Phenol	6 (3)	11 (3)	30 (3)	--	--	--
Total aromatic amines	< 100	< 100	< 100	< 100	< 100	< 100
Total aliphatic amines	220	130	240	160	280	200
Chloroform	< 10	< 10	< 10	< 10	< 1	< 1
1,2-dichloroethane	< 10	< 10	< 10	--	--	--
1,2-dichloropropane	< 10	< 10	< 10	--	--	--
Benzene	< 10	< 10	< 10	55	< 10	< 10
Toluene	< 10	< 10	< 10	15	23	< 10
Xylene	< 10	< 10	< 10	--	--	--
Styrene	< 10	< 10	< 10	< 10	20	< 10
Ethylbenzene	< 10	< 10	< 10	< 10	< 10	< 10
Acrylonitrile	<1000	<1000	<1000	U	--	--
Trichloroethylene	--	--	--	--	--	2
Other purgeable hydrocarbons	U	U	U	U	U	U

* - Collected during a period of fish stress and turnover.
(1) - Collected inside mobile laboratory rather than at the outfall sampling site.
(2) - U = undetected
(3) - Analytical method not yet approved by laboratory.

Table 8 Laboratory analyses of diluent composite samples collected from the Detroit River at BASF Wyandotte's north intake.

Sample Period		
From	6-22-81 - 1630	6-24-81 - 0755
To	6-23-81 - 1630	6-25-81 - 0755
	mg/l	mg/l
Suspended solids	11	17
Dissolved solids	160	140
COD	8	14
TOC	3.0	3.7
Cyanide (Total)	< 0.005	--
Sulfide	< 0.02	--
BOD_5	2.9	2.3
Nitrite & nitrate nitrogen-N	0.31	--
Ammonia nitrogen-N	0.33	0.35
Kjeldahl nitrogen-N	0.63	0.61
Total phosphorus-P	0.06	0.03
Chlorides	13.5	12.3
MBAS	0.02 (1)	--
	ug/l	ug/l
Phenol	5 (2)	3 (2)
Total cadmium (Cd)	< 20	< 20
Total chromium (Cr)	< 50	< 50
Hexavalent chromium (Cr^{+6})	< 2	--
Total copper (Cu)	< 20	< 20
Total nickel (Ni)	< 50	< 50
Total lead (Pb)	< 50	< 50
Total zinc (Zn)	< 50	< 50
Total iron (Fe)	270	--
Polynuclear aromatic hydrocarbons	< 1	--
PCB 1242	< 0.1	--
PCB 1254	< 0.1	--
PCB 1260	< 0.1	--
Other PCB's & organochlorine pesticides	U (3)	--

(1) - Maximum holding time exceeded.
(2) - Analytical method not yet approved by laboratory.
(3) - U = undetected

Table 9 Laboratory analyses of diluent grab samples collected from the Detroit River at BASF Wyandotte Corporation.

Sample Location	North Intake ①				At the Diluent Pump
Date	6-22-81	6-23-81	6-24-81	6-25-81	6-23-81
Time	2330	0915	2155	0750	0910
	mg/l	mg/l			mg/l
COD	6	8			15
TOC	3.5	3.5			3.4
Chlorides	12.8	13.0			12.9
Oil & Grease (Grav.)	< 2	< 2			--
Oil & Grease (I.R.)	< 1	< 1			--
Petroleum hydrocarbons	< 1	< 1			--
	ug/l	ug/l	ug/l	ug/l	ug/l
Total aliphatic amines	< 100	< 100	< 100	< 100	< 100
Total aromatic amines	< 100	< 100	< 100	< 100	< 100
Toluene	< 10	< 10	< 10	< 10	< 10
Xylene	< 10	< 10	--	--	--
Styrene	< 10	< 10	< 10	< 10	< 10
Benzene	< 10	< 10	< 10	< 10	< 10
Ethylbenzene	< 10	< 10	< 10	< 10	< 10
Chloroform	< 10	< 10	< 1	< 1	< 10
Trichloroethylene	--	--	Trace ②	3	--
1,2-dichloroethane	< 10	< 10	--	--	--
1,2-dichloropropane	< 10	< 10	--	--	--
Acrylonitrile	< 1,000	< 1,000	--	--	U
Other purgeable hydrocarbons	U ③	U	U	U	U

① - Additional intake data are available in a 1981 report by Rock and Browne.
② - Present in quantity less than detection limit.
③ - U = undetected

Table 10 Laboratory analyses of selected effluent grab samples collected at outfall 820178 (003).①

Date	6/23/81	6/23/81
Time	0815	1215
	mg/l	mg/l
Suspended solids	23	10
Dissolved solids	1,200	780
COD	300	120
TOC	83	37
BOD_5	11.	16.
Nitrite & nitrate nitrogen-N	0.46	0.40
Ammonia nitrogen-N	0.95	0.84
Kjeldahl nitrogen-N	2.6	2.1
Total phosphorus-P	0.23	0.24
Chlorides	510	320
Oil & Grease (I.R.)	38	13
Oil & Grease (Gravimetric)	68	28
Petroleum hydrocarbons	25	9
	ug/l	ug/l
Phenol	29②	22②
Total aliphatic amines	460	130
Total aromatic amines	< 100	< 100
Benzene	< 10	< 10
Toluene	< 10	< 10
Xylene	< 10	< 10
Styrene	< 10	< 10
Ethylbenzene	< 10	< 10
Acrylonitrile	< 1,000	< 1,000
Chloroform	< 10	< 10
1,2-Dichloroethane	120	39
1,2-Dichloropropane	1,400	1,200
Other purgeable hydrocarbons	U③	U

① - Addition grab and composite sample data available in Rock and Browne (1981).
② - Analytical method not yet approved by laboratory.
③ - U = undetected.

Table 11 Comparison of study results with BASF Wyandotte Corporation's NPDES Permit (MI0000540).

Parameter (Unit)	NPDES Permit Final Limitations		Study Results[1]	
	Average	Maximum	6/22-23/81	6/24-25/81
820180 (001)				
Flow (M^3/day)	--	--		
BOD5 (mg/l)	--	--	24 (8.0, 12., 78.)	15
Suspended solids (mg/l)	20 net[2]	60 net	2	3
Suspended solids (kg/day)	811 net	2434 net	46	75
Total phosphorus (mg/l)	1.0	2.0	0.09 (0.09, 0.06, 0.11)	0.06
Total phosphorus (kg/day)	41	81	2	2
Chlorides (mg/l)	--	--	18.2 (21., 16., 33.)	19.3
Chlorine (mg/l)	--	0.5	(U, U, U[3] - See also Table 4)	
COD (mg/l)	--	--	97 (58, 42, 420)	180
Petroleum hydrocarbons[4] (mg/l)	--	10	(11, <1, 4)	
Phenol (ug/l)	--	--	17 (6, 11, 30)	8
pH (S.U.)	not <6.5 nor >9.5		Study Maximum = 8.4 @ 1115 6/26/81[5] Study Minimum = 6.8 @ 1730 6/25/81	
Intake[6]				
Suspended solids (mg/l)	--	--	11	17

[1] - Study results are taken from Tables 6 - 8. Results in parentheses ( ) are for grab samples. Others are composite sample data. To obtain MGD multiply M^3/day by 0.0002642 - to obtain lbs/day, multiply kg/day x 2.205.

[2] - Net = difference between discharge and intake values.

[3] - U = undetected.

[4] - As defined by Environmental Monitoring & Support Laboratory, U.S.EPA, Cincinnati, OH (7/75).

[5] - From a continuous pH recording of the 96-hour study period.

[6] - Data presented here are from the north (polyols) intake. The south intake (820407) was monitored by BWC for permit reporting purposes at the time of the study.

APPENDIX F

EXHIBIT 7

Item 2.4

Fig. 1 — Outfall 003 Monitoring

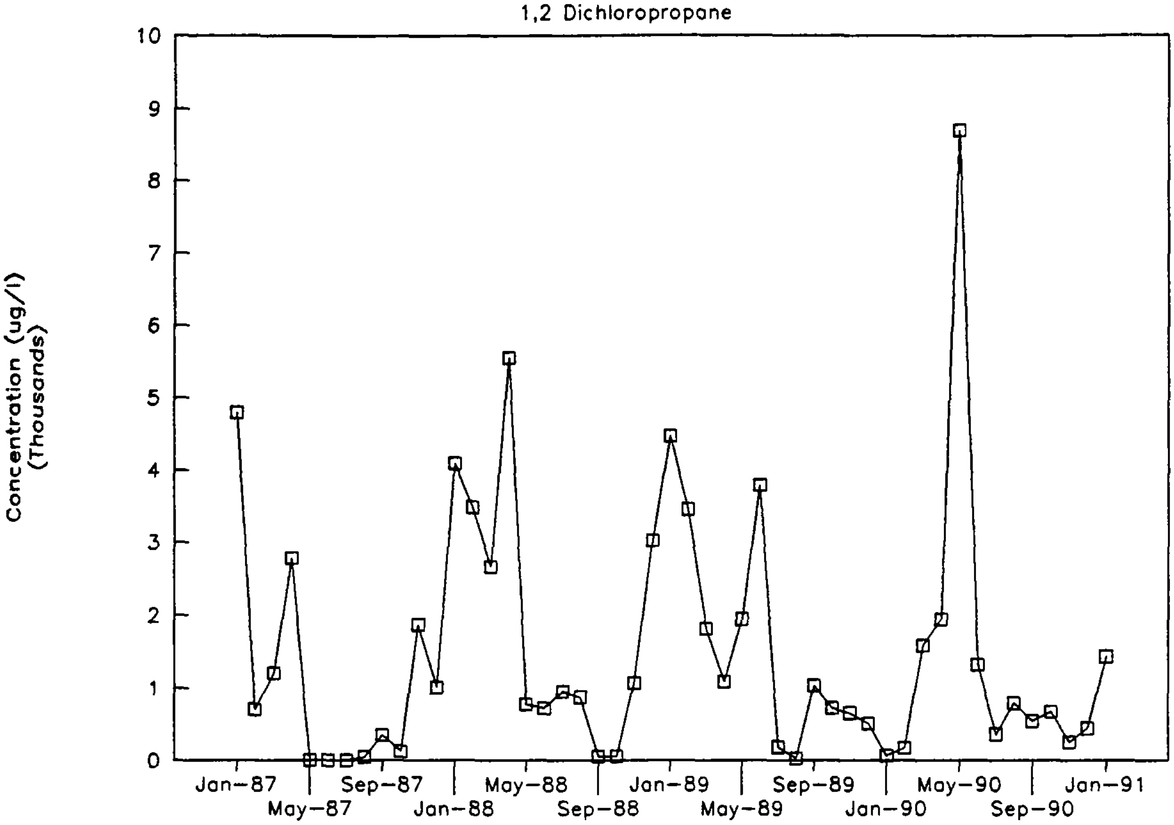


Fig. 2 — Outfall 003 Monitoring

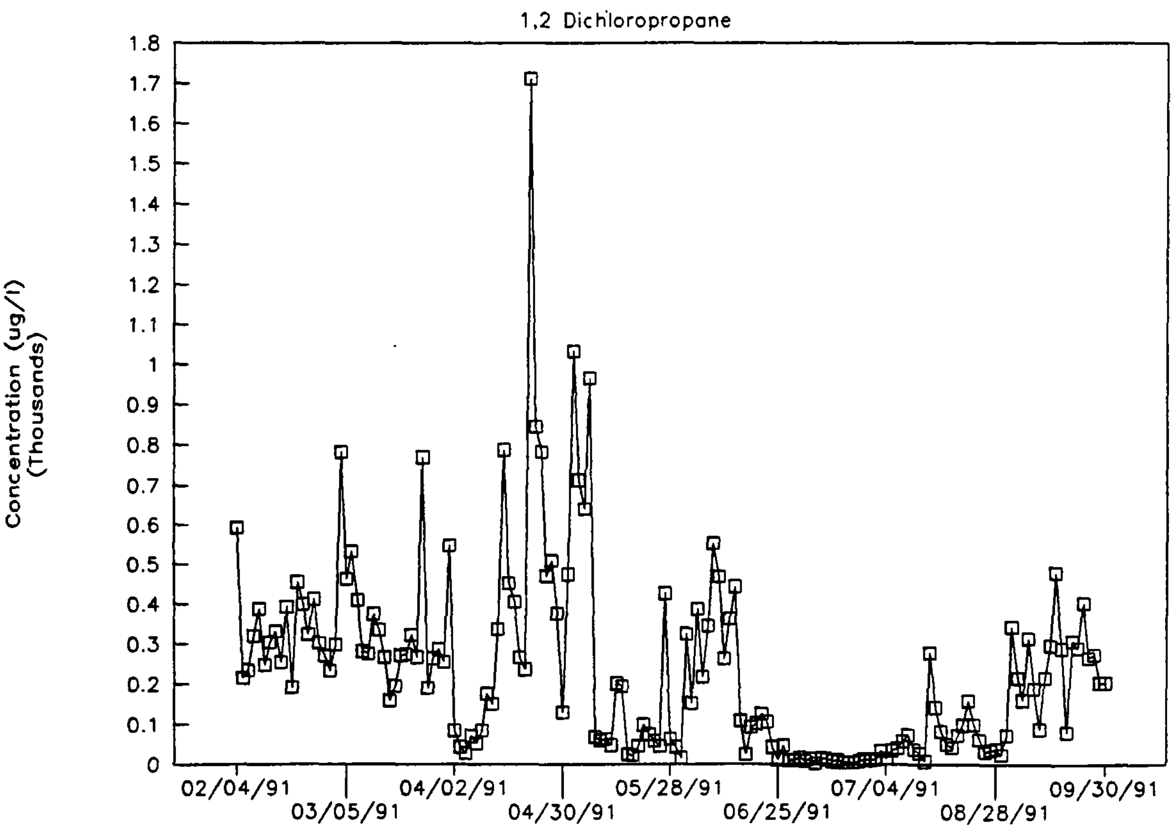


Fig. 3 — Outfall 003 Monitoring

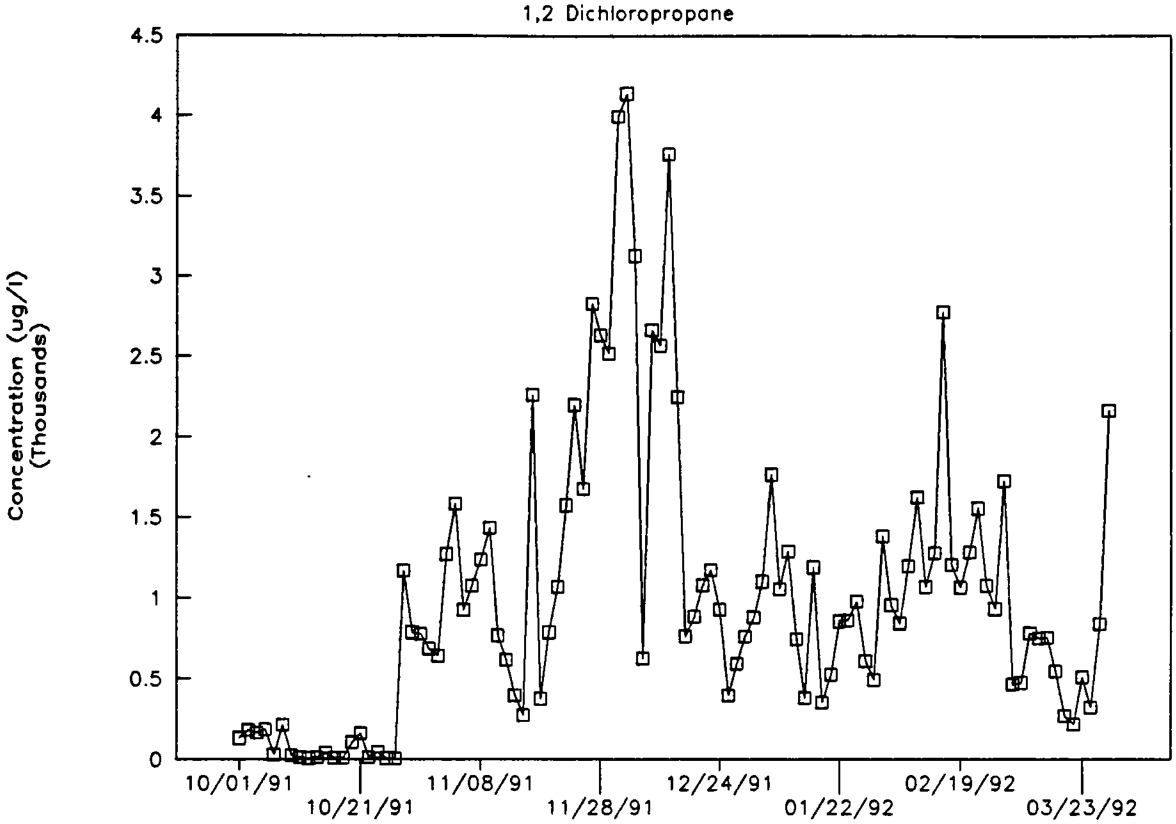


Fig. 4 — Outfall 003 Monitoring

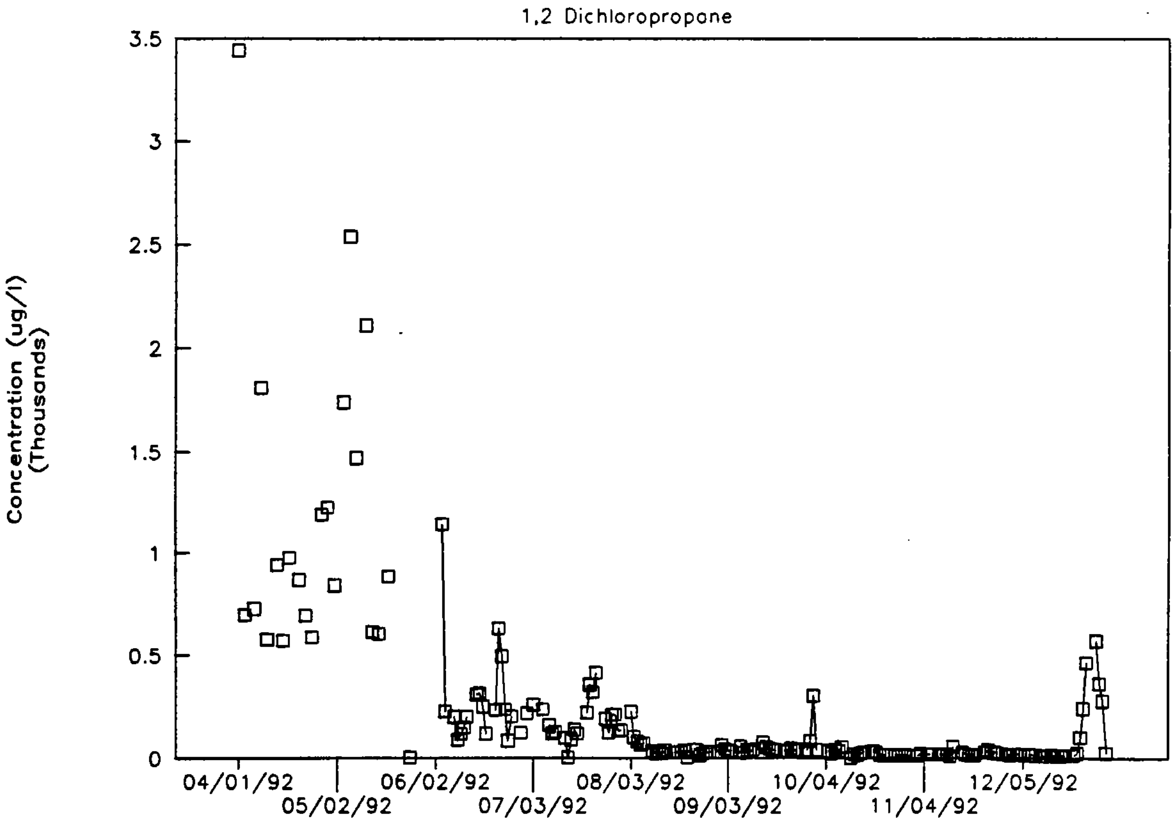


Fig. 5 — Outfall 003 Monitoring

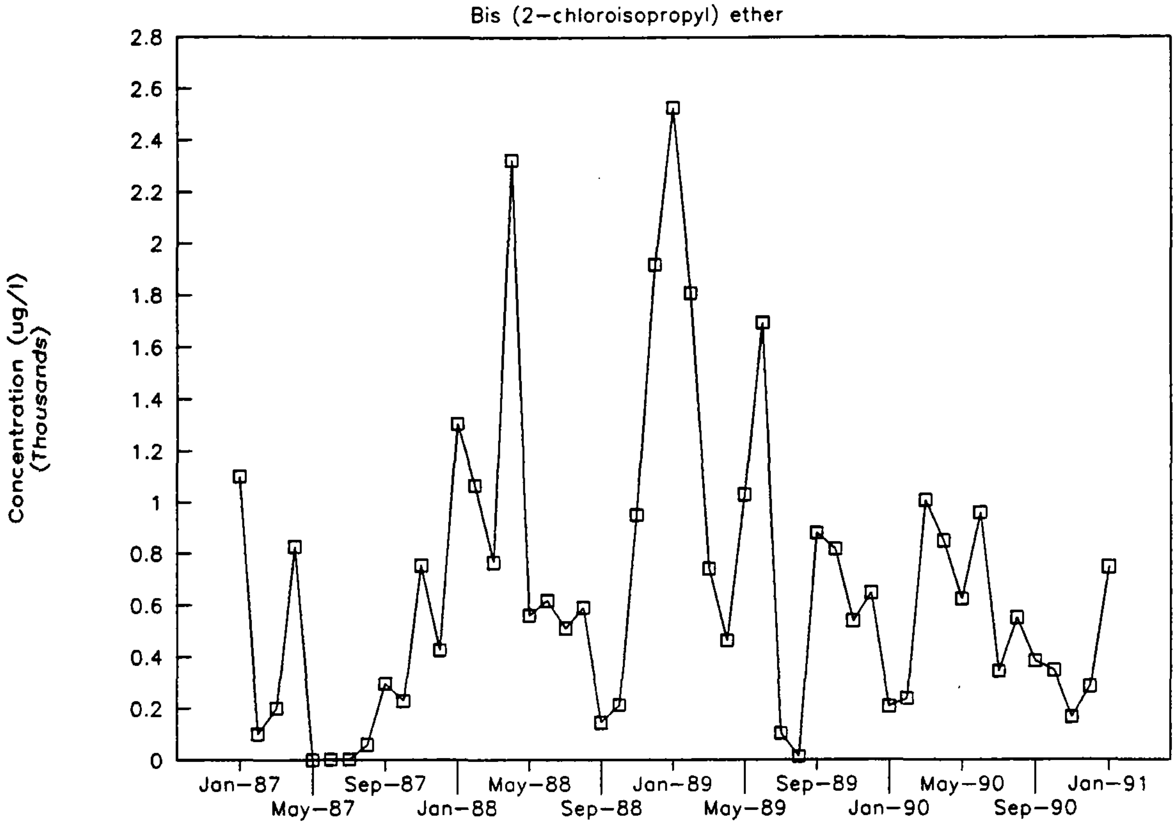


Fig. 6 — Outfall 003 Monitoring

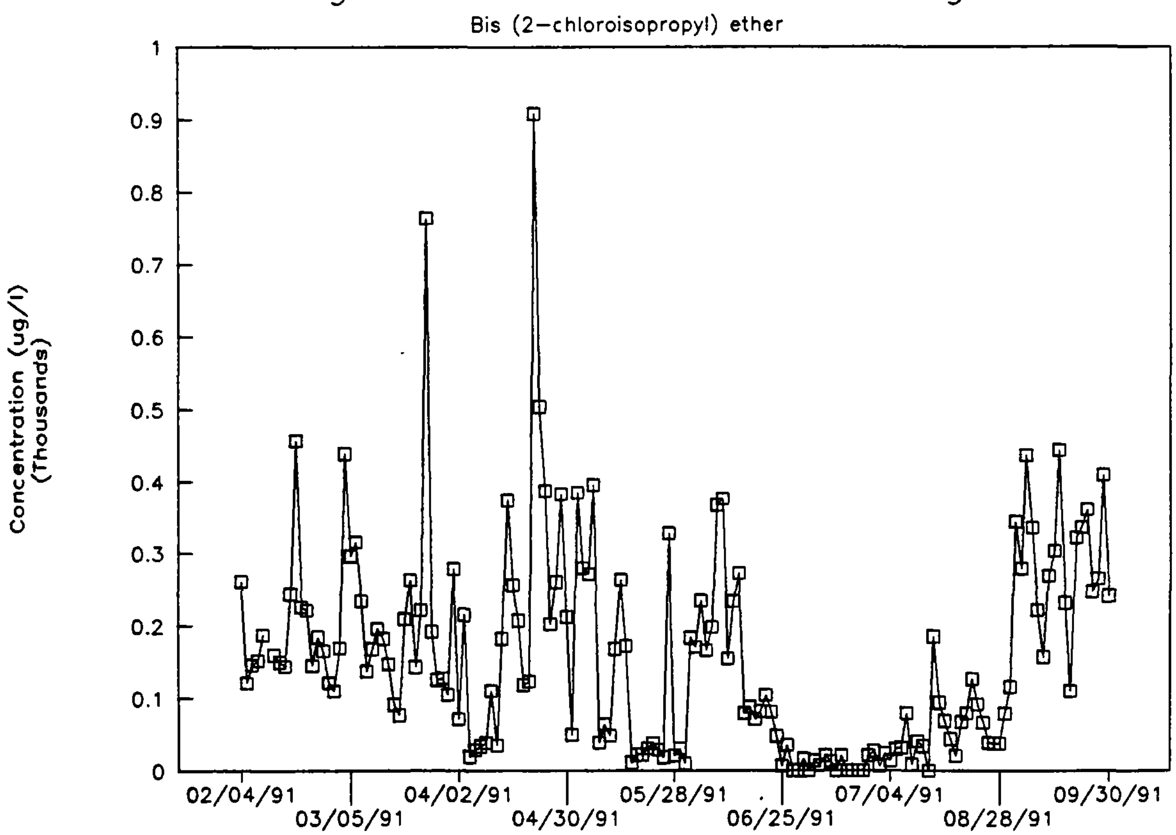


Fig. 7 – Outfall 003 Monitoring

Bis (2-chloroisopropyl) ether

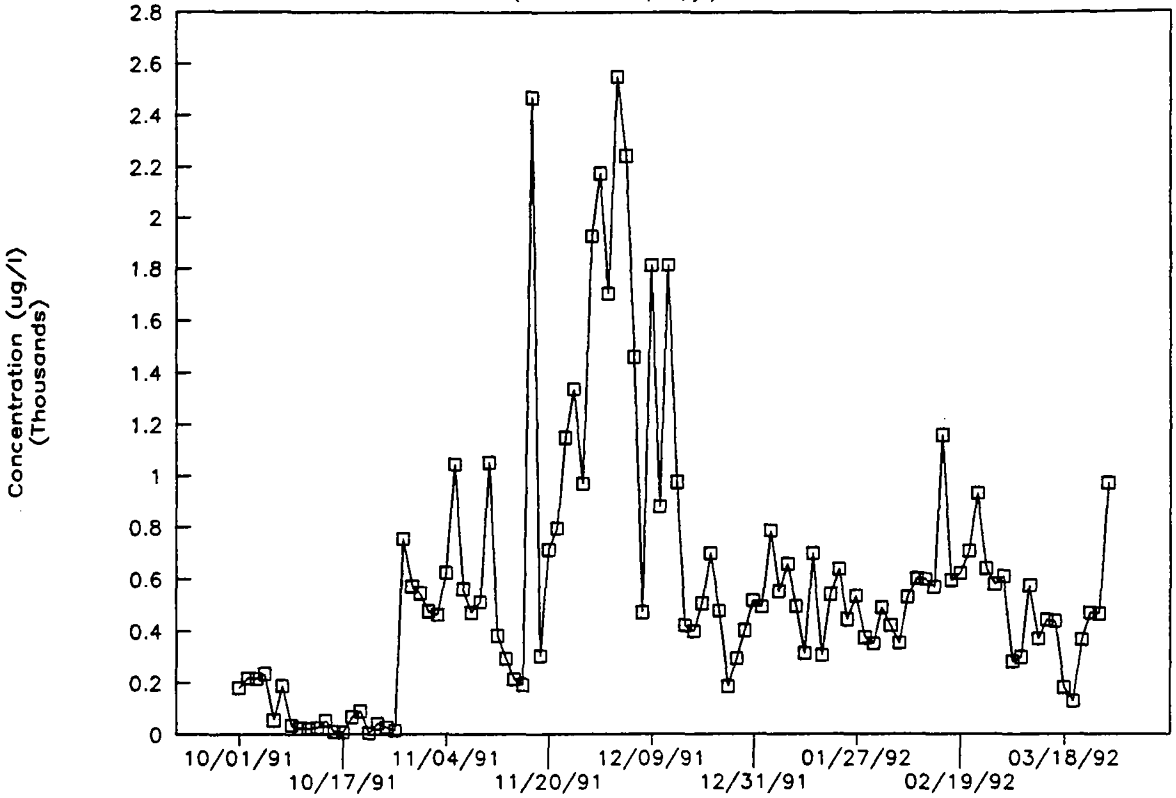
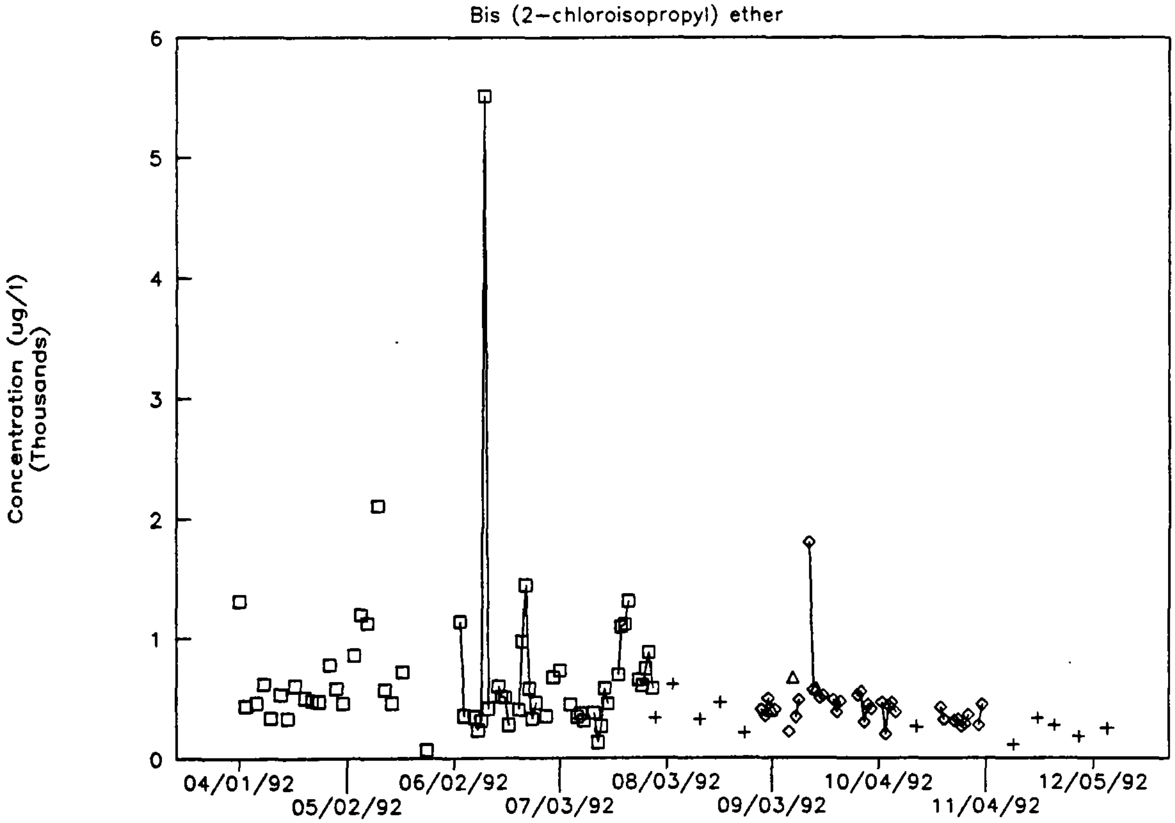
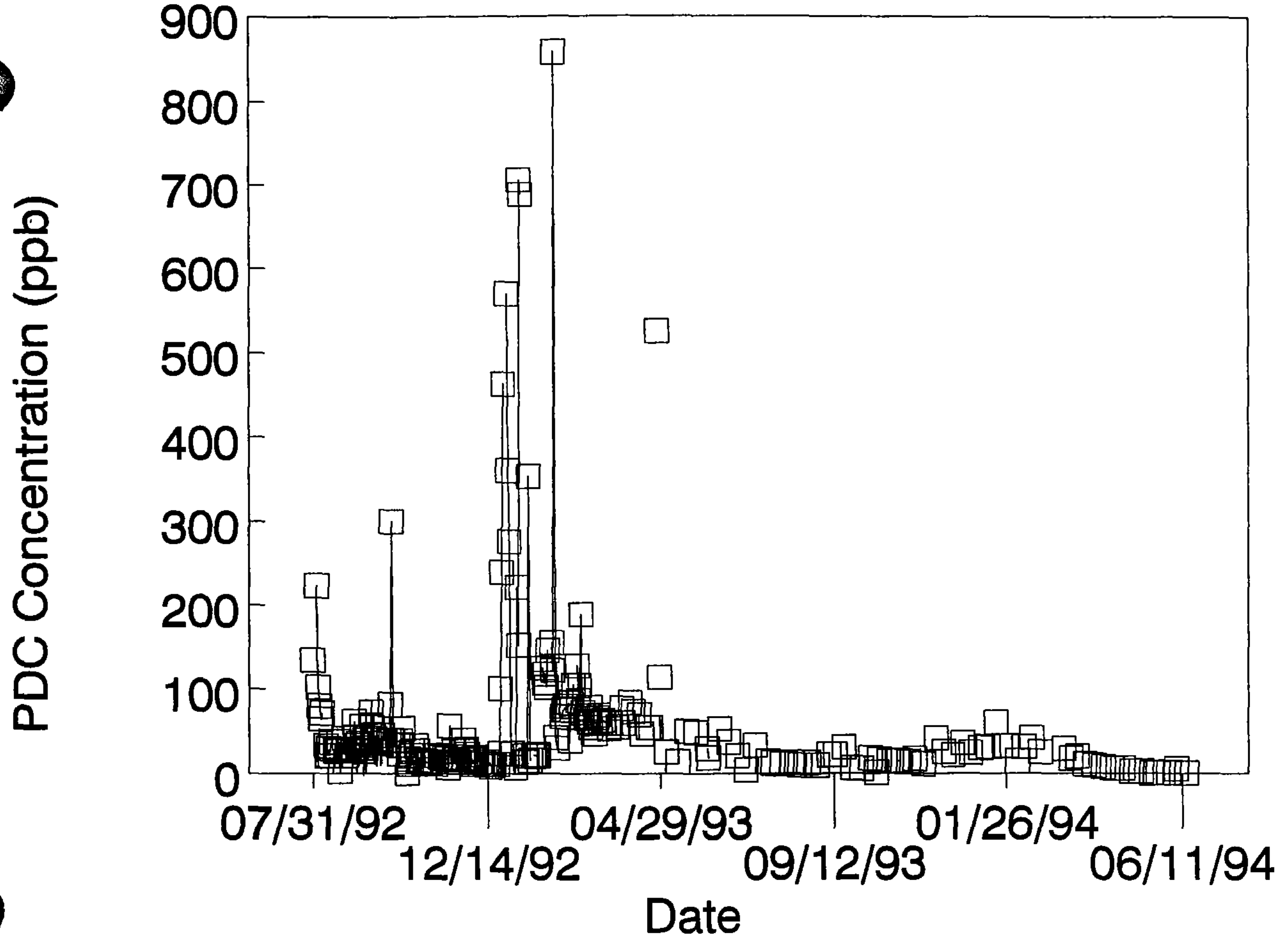
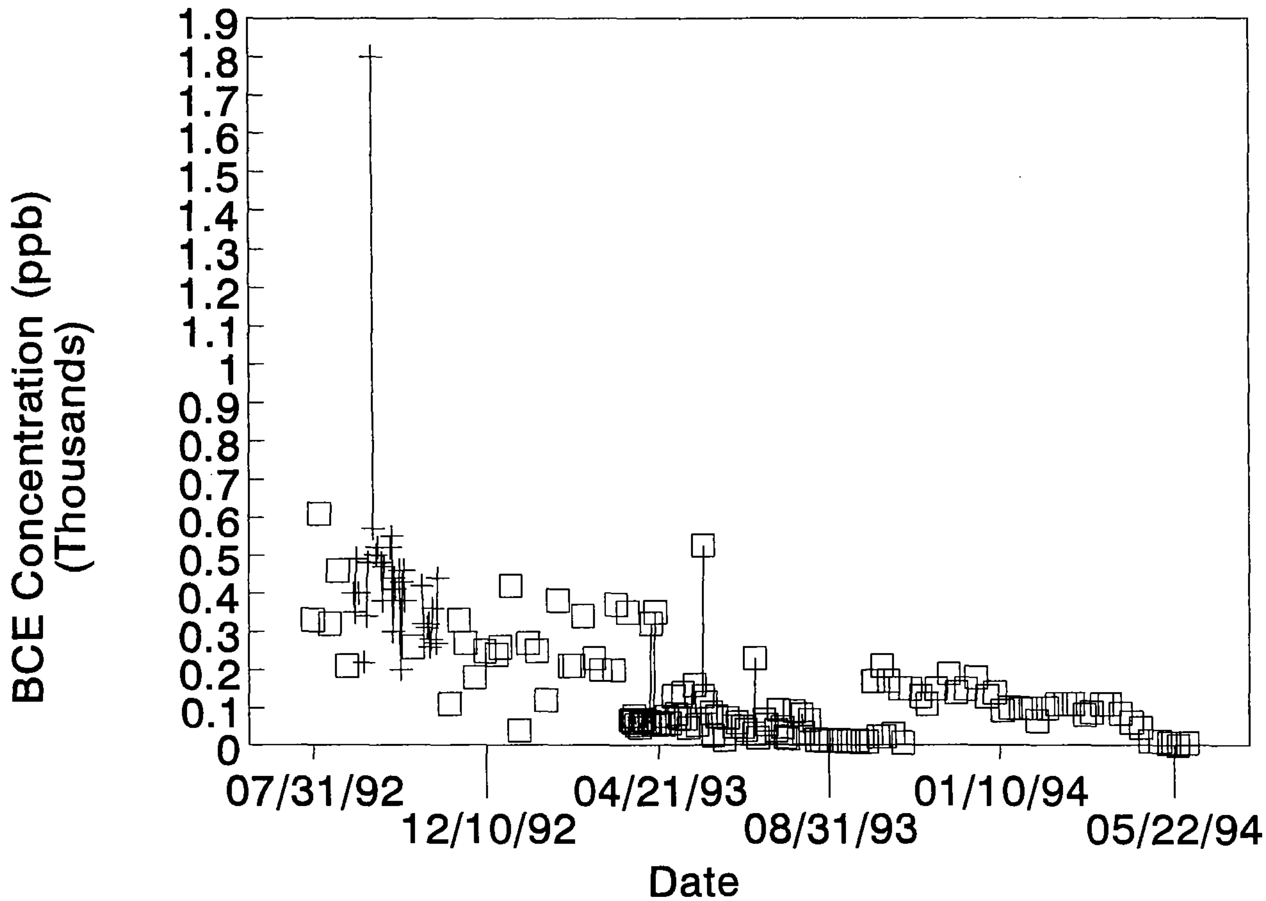


Fig. 8 – Outfall 003 Monitoring

Bis (2-chloroisopropyl) ether




900
800
700
600
500
400
300
200
100
0
PDC Concentration (ppb)
07/31/92
12/14/92
04/29/93
09/12/93
01/26/94
06/11/94
Date


1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
BCE Concentration (ppb)
(Thousands)
07/31/92
12/10/92
04/21/93
08/31/93
01/10/94
05/22/94
Date

APPENDIX F

EXHIBIT 8

WAYNE COUNTY DEPARTMENT OF PUBLIC SERVICES
DIVISION OF PUBLIC WORKS

EDWARD H. McNAMARA
COUNTY EXECUTIVE

JAMES E. MURRAY
DIRECTOR
224-3630

INDUSTRIAL PRETREATMENT SECTION
740 CENTRAL AVENUE
WYANDOTTE, MI 48192
(313) 285-2780

October 26, 1992

BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192
Attn: Mr. Charles Anderson

Dear Charlie:

Enclosed is the signed, Final Class D Wastewater Discharge Permit for BASF. The permit comments telefaxed on October 20, 1992, have been incorporated into the finalized Permit, wherever justified. The Permit is effective immediately.

If you have any additional questions, feel free to contact Mr. Daniel R. Helm, Mr. Walter Syrkowski, or me at (313) 285-2780.

Very truly yours,

WAYNE COUNTY DIVISION OF PUBLIC WORKS

Terrance A. Galloway (WS)
Terrance A. Galloway, P. E.

Engineer of Industrial Pretreatment

TAG/DRH/sv

c: City of Wyandotte
Attn: Mark Kowalewski
Otis Walker - WCDPW Lab
File

WAYNE COUNTY DEPARTMENT OF PUBLIC SERVICES
DIVISION OF PUBLIC WORKS
740 CENTRAL AVENUE
WYANDOTTE, MICHIGAN 48192
285-2780

INDUSTRIAL PRETREATMENT PROGRAM
CLASS D WASTEWATER DISCHARGE PERMIT

Permit No.: D-11311
Expiration Date: 10/25/95
Effective Date: 10/26/92

In accordance with the provisions of Article V, Section 4.02 of the Wayne County Sewer Use Ordinance and pursuant to the requirements of the Industrial Pretreatment Program as specified in 40 CFR 403.8 (f),

BASF CORPORATION*
1609 Biddle Avenue
Wyandotte, MI 48192
Contact Person(s):

Charles Anderson	Phone No.	246-5131
Carlene LaScola		246-6834
Douglas Thiel		246-6209
	24 Hour Emergency No.	246-6506

* North Works site.

is hereby authorized to discharge industrial wastewater from the above identified facility and through the outfalls identified herein into the sanitary sewer system tributary to the Wyandotte Wastewater Treatment Plant in accordance with the conditions set forth in this permit. Compliance with this permit does not relieve the permittee of its obligation to comply with any or all applicable Pretreatment regulations, standards, or requirements under local, State, and Federal laws, including any such regulations, standards, requirements, or laws that may become effective during the term of this permit.

The permittee is subject to the Federal Categorical Pretreatment Standards for Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) - 40 CFR Part 414.65, 75, 85 PSES, (Subparts F,G,H) and 40 CFR 414.46 (Subpart D), PSNS.

Noncompliance with any term or condition of this permit shall constitute a violation of the Wayne County Sewer Use Ordinance.

If the permittee wishes to continue to discharge after the expiration date of this permit, an application must be filed for permit reissuance in accordance with the requirements of Article V, Section 4 of the Wayne County Sewer Use Ordinance, a minimum of 90 days prior to the expiration date.

The permittee shall pay an ANNUAL SURVEILLANCE FEE OF $5,250.00, in accordance with the conditions of Part II.A.4 of this permit.

Authorization of Permit: Wayne County Division of Public Works

Signature of Official: Terrance A. Galloway (as)

Title: Engineer of Industrial Pretreatment

Date: October 27, 1992

PART I

A. DISCHARGE LIMITATIONS

1. Discharge Limitations

The permittee is authorized to discharge: process wastewater consisting of 1) reactors washdown, 2) polyol scrubber, 3) Small Scale Building 53-Z steam jet ejectors, 4) floor washings in all plants, and 5) groundwater remediation wastewater from North Works site, processed through carbon adsorption system.

Sample Point	Description
001	Main sample point #1 - Alkali St. by EMB Building see sketch, Attachment "C".
002	Polyol Plant, recycle line on Neutralization tank, see sketch, Attachment "C".
003	Small Scale Facility, Bldg. 53-Z, sump in southwest corner, outside building, see sketch, Attachment "C".
004	TPU Plant, M.H. #10, northeast of plant, near transformer, see sketch Attachment "C".
007	Carbon pretreatment system, North Works, effluent, see sketch Attachment "C".
008	Main sample point #2 - Perry St., north of Kreelon Building parking lot, see sketch Attachment "C".

Note: Sample Points 002, 003, and 004 are OCPSF Federal Categorical regulated facilities.

2. Summary Table

a. Limitations per 40 CFR Part 414.65, 75, 85 Subparts F, G, H, Pretreatment Standards for Existing Sources (PSES), for Polyol Plant and for the Small Scale, Building 53-Z facility:

	Polyol Plant**		Small Scale, 53-Z+		
Effluent Characteristic	Maximum for any one day, lbs/day	Maximum for monthly average lbs/day	Maximum for any one day, lbs/day	Maximum for monthly average, lbs/day	Self-Mon-itoring* Sampling Points
Benzene	0.0083	0.0035	0.115	0.0489	002,003
Carbon Tetrachloride	0.0237	0.0088	0.326	0.122	" "
Chlorobenzene	0.0237	0.0088	0.326	0.122	" "

PART I

Summary Table - Cont'd

Effluent Characteristic	Polyol Plant** Maximum for any one day, lbs/day	Polyol Plant** Maximum for monthly average lbs/day	Small Scale, 53-Z+ Maximum for any one day, lbs/day	Small Scale, 53-Z+ Maximum for monthly average, lbs/day	Self-Monitoring* Sampling Points
1,2,4-Trichlorobenzene	0.0496	0.0122	0.681	0.168	002,003
Hexachlorobenzene	0.0496	0.0122	0.681	0.168	" "
1,2-Dichloroethane	0.0358	0.0112	0.492	0.154	" "
1,1,1-Trichloroethane	0.0036	0.0013	0.0506	0.0189	" "
Hexachloroethane	0.0496	0.0122	0.681	0.168	" "
1,1-Dichloroethane	0.0036	0.0013	0.0506	0.0189	" "
1,1,2-Trichloroethane	0.0079	0.0020	0.109	0.0274	" "
Chloroethane	0.0184	0.0068	0.253	0.0944	" "
Chloroform	0.0203	0.0069	0.279	0.0952	" "
1,2-Dichlorobenzene	0.0496	0.0122	0.681	0.168	" "
1,3-Dichlorobenzene	0.0238	0.00888	0.326	0.122	" "
1,4-Dichlorobenzene	0.0238	0.00888	0.326	0.122	" "
1,1-Dichloroethylene	0.0037	0.0013	0.0515	0.0189	" "
1,2-trans-Dichloroethylene	0.0041	0.0015	0.0566	0.0214	" "
1,2-Dichloropropane	0.0496	0.0122	0.681	0.168	" "
1,3-Dichloropropylene	0.0496	0.0122	0.681	0.168	" "
Ethylbenzene	0.0238	0.00888	0.326	0.122	" "
Methylene Chloride	0.0106	0.0022	0.146	0.0309	" "
Methyl Chloride	0.0184	0.0068	0.253	0.0944	" "
Hexachlorobutadiene	0.0238	0.00888	0.326	0.122	" "
Nitrobenzene	0.400	0.1398	5.49	1.92	" "
2-Nitrophenol	0.0144	0.0040	0.198	0.055	" "
4-Nitrophenol	0.0360	0.0101	0.494	0.139	" "
4,6-Dinitro-0-cresol	.0173	.0048	0.238	0.0669	" "
Tetrachloroethylene	.0102	.0032	0.141	0.0446	" "
Toluene	.0046	.0017	0.0635	0.0240	" "
Trichloroethylene	.0043	.0016	0.0592	0.0223	" "
Vinyl Chloride	.0107	.0060	0.148	0.0832	" "
Total Cyanide	.0750	.0262	1.03	0.360	" "
Total Lead	.0431	.0200	0.592	0.274	" "
Total Zinc	.1632	.0656	2.24	0.900	" "

*Sample Type is per EPA protocol. Measurement frequency is uniformly, for all above parameters, Semiannually in June and December. Actual flow measurement of wastewater at time of sampling, is required.

**Flow basis for mass limit calculations was that a 7,500 gallon wastewater batch is discharged from the Polyol Plant Neutralization Tank during a one day period of time.

+Flow basis for mass limit calculations was 103,000 gallons per day contact sources wastewater, annual average projected flow from Building 53-Z, OCPSF Small Scale facility; transmittal letter is dated August 31, 1992, from Mr. Doug Thiel, BASF, to Daniel R. Hel[illegible] WCDPW.

PART I

b. Limitations per 40 CFR Part 414.46 Subpart D, Pretreatment Standards for New Sources (PSNS), for Thermoplastic Polyurethane Plant (TPU):

Effluent Characteristic	TPU Plant*** Maximum for any one day, lbs/day	TPU Plant*** Maximum for monthly average lbs/day	Self-Monitoring* Sampling Point
Benzene	0.0256	0.0109	004
Carbon Tetrachloride	0.0728	0.0272	"
Chlorobenzene	0.0728	0 0272	"
1,2,4-Trichlorobenzene	0.1522	0.0375	"
Hexachlorobenzene	0.1522	0.0375	"
1,2-Dichloroethane	0.1100	0.0345	"
1,1,1-Trichloroethane	0.0113	0.0042	"
Hexachloroethane	0.1522	0.0375	"
1,1-Dichloroethane	0.0113	0.0042	"
1,1,2-Trichloroethane	0.0243	0.0061	"
Chloroethane	0.0565	0.0210	"
Chloroform	0.0623	0.0212	"
1,2-Dichlorobenzene	0.1522	0.0375	"
1,3-Dichlorobenzene	0.0728	0.0272	"
1,4-Dichlorobenzene	0.0728	0.0272	"
1,1-Dichloroethylene	0.0115	0.0042	"
1,2-trans-Dichloroethylene	0.0126	0.0047	"
1,2-Dichloropropane	0.1522	0.0375	"
1,3-Dichloropropylene	0.1522	0.0375	"
Ethylbenzene	0.0728	0.0272	"
Methylene Chloride	0.0325	0.0069	"
Methyl Chloride	0.0565	0.0210	"
Hexachlorobutadiene	0.0728	0.0272	"
Nitrobenzene	1.2275	0.4289	"
2-Nitrophenol	0.0442	0.0124	"
4-Nitrophenol	0.1104	0.0310	"
4,6-Dinitro-0-cresol	0.0531	0.0149	"
Tetrachloroethylene	0.0314	0.0099	"
Toluene	0.0141	0.0053	"
Trichloroethylene	0.0132	0.0049	"
Vinyl Chloride	0.0329	0.0185	"
Total Cyanide	0.2301	0.0805	"
Total Lead	0.1323	0.0613	"
Total Zinc	0.5004	0.2013	"

*Sample Type is per EPA protocol. Measurement frequency is uniformly, for all above parameters, Semiannually in June and December. Actual flow measurement of wastewater at time of sampling, is required.

***Flow rate basis for mass limit calculations was 23,000 gpd (gallons per day) average wastewater flow for TPU Plant.

PART I

c. Local limitations per Wayne County Sewer Use Ordinance (WCSUO):

Effluent Characteristic	Discharge Limitations mg/liter Average Daily Concentration		Self-Monitoring Requirements Measurement Frequency	Sample Type	Sampling Point
Biochemical Oxygen Demand, 5 day (BOD5)	N/A		1 sampling day quarterly	24 Hr. Composite	001, 008
Total Suspended Solids (TSS)	N/A		1 sampling day quarterly	24 Hr. Composite	001, 008
Total Phosphorus	N/A		1 sampling day quarterly	24 Hr. Composite	001
Zinc (Total)	15.0		1 sampling day quarterly	24 Hr. Composite	001
Nickel (Total)	5.0		1 sampling day quarterly	24 Hr. Composite	001
1,2 - Dichloroethane	1.40		1 sampling day quarterly	EPA Protocol	007
1,2 - Dichloropropane	0.25		1 sampling day quarterly	EPA Protocol	007
Methylene Chloride	0.25		1 sampling day quarterly	EPA Protocol	007
Chloroform	0.25		1 sampling day quarterly	EPA Protocol	007
Fats, Oil, & Grease (FOG)	100 mg/l,		1 sampling day quarterly	Grab	004
	Min.	Max.			
pH (Standard Units)	5.0	9.5	1 sampling day quarterly	Grab (batch tank)	002
pH (Standard Units)	5.0	9.5	1 sampling day quarterly	Grab	001, 008

3. Discharge Requirements

   a. Permittee agrees to immediately stop all pumping of extracted groundwater to the sanitary sewer system if conditions at the Wyandotte Wastewater Treatment Plant warrant such action.

   b. Discharge process wastewater volume from the Polyol Plant scrubber system shall be metered into batch neutralization tank and total volume discharged shall be reported to WCDPW on a quarterly basis. If batch volume is uniform, then the number of batches discharged per quarter must be reported.

   c. Discharge process wastewater volume from the Thermoplastic Polyurethane Plant (TPU) shall be metered and total volume discharged shall be reported to WCDPW on a quarterly basis.

   d. Discharge process wastewater volume from the Small Scale Facility (Building 53-Z) shall be metered and total volume discharged shall be reported to WCDPW on a quarterly basis.

B. MONITORING

1. Definitions

   a. The monthly average limitation is defined as the arithmetic average of sample results for the month.

   b. The daily maximum limitation is defined as the maximum concentration, of sample results for any one day.

2. Analytical Procedures

   Analytical procedures for the analysis of pollutants must conform to regulations published in 40 CFR Part 136.

3. Representative Sampling

   The samples and measurements that are taken as a result of requirements in this permit, must be representative of the effluent being discharged during a typical workday.

4. Sample Type

A grab sample is defined as an "instantaneous" sample which represents the composition of the effluent in an instant of time. A grab must not be collected for more than 15 minutes of flow sampling duration. A composite sample is collected from the effluent stream over an extended period of time, usually for a 24 hour period.

5. Sampling Point

Samples shall be taken as described in Part A.1. and Attachment "C". Sample locations are not to be changed without prior written approval from the Wayne County Division of Public Works - IPP Section.

6. Sampling Frequency

The effluent must be monitored and sampled at the frequency indicated in the Summary Table above. This applies for all the parameters shown in the table.

C. ADDITIONAL MONITORING

1. Greater Sampling Frequency

If the permittee samples and monitors any pollutant using EPA approved procedures, at the sampling point(s) described in this permit, more frequently than required, then the results of this sampling and monitoring must be included in the Self-Monitoring Report. Permittee must calculate and report average values in the Report, taking the additional sampling and monitoring into account.

2. Surcharge

Biochemical Oxygen Demand, 5 Day (BOD5), Total Suspended Solids (TSS), and Total Phosphorus (P) are surchargeable parameters. If the discharge contains concentrations of these compatible pollutants in excess of the allowable concentrations (BOD = 275, TSS = 350 and P = 12, all in mg/l) the permittee must pay a surcharge on the excess amount. The permittee may elect to do monthly self-monitoring of these parameters and have the results included in the determination of the surcharge and must then comply with the Surcharge Policy of the County.

3. Non-Compliance Additional Sampling

If a permittee is in non-compliance and subject to enforcement actions, additional self-monitoring may be required. The additional self-monitoring may be required until such time as the permittee can demonstrate compliance.

PART I

D. **REPORTING**

1. Periodic Compliance

The permittee shall summarize and submit Periodic Compliance Reports of their Self-monitoring analytical results on a quarterly basis, except for the OCPSF Federal Categorical regulated processes, which are semi-annual. The quarterly periods end the last day of March, June, September, and December. The permittee shall also report process wastewater volumes quarterly for the OCPSF processes. The Periodic Compliance Reports shall be received by the 15th day of the month following the end of the period.

2. Baseline Monitoring Report

The permittee has submitted Baseline Monitoring Reports (BMRs) for all OCPSF plants as required in 40 CFR Part 403.12 (b).

3. Signatory Requirements for Reports

The Baseline Monitoring Report (BMR), and Periodic Compliance Reports shall include the certification statement pursuant to 40 CFR 403.6 (a)(2)(ii) and shall be signed by an authorized representative of the industrial user per Article 1 Section 1 definition 4 of the Wayne County Sewer Use Ordinance (WCSUO).

4. Batch pH Log Report (for Polyol plant scrubber wastewater):

Report must be kept on file by permittee - it will be reviewed during inspections. Batch pH log shall contain the following:

a. Handwritten or typed on 8 1/2" x 11" paper.

b. Column headings: Date, time of observation, initial pH (before adjustment), final pH (after adjustment), corrective actions taken, and operator name or initials.

c. Option: Permittee may, as an alternate, elect to purchase, install, and operate a pH recorder to monitor batch discharges of pretreated wastewater. The strip chart shall be kept on file by permittee - it will be reviewed during inspections.

E. **COMPLIANCE SCHEDULE**

1. Progress Reports on Compliance Milestone Dates

The permittee shall submit written notification to the County, within 14 calendar days of every compliance milestone date, or any other requirement date as specified in this permit, or as a part of a Compliance Schedule resulting from enforcement action. These reports shall indicate whether or not the milestone date or other requirement was achieved.

PART I

If the milestone or other requirement was not achieved, the notification must include an explanation of the failure to achieve the milestone or other requirement, actions taken or planned to correct the situation, and must give an estimate of when the milestone or other requirement will be achieved.

If the milestone is a written report and the permittee submits the report by the due date, no progress report is required.

PART II

GENERAL TERMS AND CONDITIONS

1. Entry

The permittee shall allow County personnel, upon the presentation of credentials, access at all reasonable times to all parts of the premises for the purposes of inspection, sampling, records, examination, copying or the performance of any of their duties related to the administration of this permit and/or the County's Industrial Pretreatment Program.

2. Retention of Records

a. The permittee shall keep records for at least three (3) years of the following:

   i. all monitoring information - includes all calibration and maintenance records
   ii. all original strip chart recordings
   iii. copies of all reports required by this permit
   iv. records of all data used to complete the Industrial-Commercial Waste Questionnaire, which serves as the application for this permit.

Note: The three (3) year time period is 3 years from date of the sample, measurement, report, or submission of the Industrial-Commercial Waste Questionnaire, to WCDPW. This period may be extended by request of WCDPW IPP staff, at any time.

b. All records that apply to matters that are the subject of special orders or any other enforcement or litigation activities brought about by WCDPW shall be kept and preserved by the permittee until all enforcement activities have concluded. Also, until all periods of limitation regarding appeals have expired.

3. Penalties for Violations of Permit Conditions

The Wayne County Sewer Use Ordinance (WCSUO), provides that any person who violates a permit condition is subject to a civil penalty of not more than $500.00, plus actual damages incurred by the POTW per violation per day for as long as the violation continues.

A person who willfully or negligently violates permit conditions is subject to criminal penalties, as per the WCSUO, Article V, Section 6.10.3 and may be punished by a fine of not more than $500.00, or by imprisonment in the Wayne County Jail for not more than ninety (90) days or both.

4. Fee and Charges

The permittee shall agree to pay applicable annual surveillance fees and surcharges as established and billed by the county.

General Terms and Conditions - Cont'd

5. Additional Sewer Information

   The permittee shall agree to furnish the county, upon request, any additional information relating to the installation or use of the sewer.

6. Operate Pretreatment Facilities

   a. Operation: The permittee shall operate and maintain any industrial wastewater pretreatment facilities, as may be required by this permit, in an efficient manner at all times, and at no expense to the County.

   b. Plans for new pretreatment facilities must be submitted for approval, prior to commencing construction. Submit plans to the County, at the address on the cover sheet of this permit.

B. **NOTIFICATION REQUIREMENTS**

1. Non-compliance Notification and Resampling. If the results of the permittee's self-monitoring indicates that a violation of this permit has occurred, the permittee must, in accordance with 40 CFR 403.12 (g)(2):

   a. Inform the County by telephone of the violation within 24 hours, of becoming aware of the violation, and

   b. Repeat the sampling and analysis and submit, in writing the results of this second analysis within thirty (30) days of the first violation.

2. By-Pass Notification

   By-pass of pretreatment facilities necessary to maintain compliance with all the requirements of this permit is prohibited, unless

   a. By pass was unavoidable to prevent loss of life, personal injury, or severe property damage.

   b. There were no feasible alternatives to the by-pass.

   c. The permittee submitted notices as required under paragraph (c) of 40 CFR Part 403.17.

   d. The county may approve an anticipated by-pass discharge, after considering its adverse effects in accordance with 40 CFR 403.17 (d)(2).

Notification Requirements - Cont'd

3. Slug Discharge and Spill Control Plan

Industrial Users shall provide protection from accidental discharges of substances which may cause interference at the wastewater treatment plant(s) pursuant to Article V, Section 2.04 of the WCSUO. Where necessary, spill prevention or slug control plans shall be developed by the user to address notification, slug or spill prevention, containment spill cleanup and employee training and submit it to the IPP Section for approval prior to construction. Approval of such plans shall not relieve the industrial user from complying with laws and regulations governing handling of hazardous substances. Any required facilities shall be provided and maintained at the users expense.

Spill Notification

The permittee must immediately report any spill which may cause increased pollution of normal industrial and/or sanitary wastewater. Call County personnel at (313) 285-5215 and report the:

1) location of discharge, 2) date and time of discharge spill, 3) type of waste, 4) concentration and volume of the spill, and 5) describe the corrective actions taken to prevent future spills.

If a major spill occurs which might affect storm sewers or open waterways, call the Michigan Department of Natural Resources (MDNR), at 1-800-292-4706 and report the spill.

Written notification is required to the County within five (5) days pursuant to 40 CFR 403.8 (f)(2)(v).

Slug Notification

The permittee must immediately report any slug (a slug is defined as a non-routine batch discharge, a release or spill from large chemical storage tanks, a discharge of wastewater which is four (4) times the average 24 hour concentration or is four (4) times over the flow limit for at least 15 minutes) to the County sewer system.

This slug could be at a flow rate and/or pollutant concentration which will cause interference with the POTW operations or a passthrough. Call the County at the phone number given for spill notification. Report the: 1) location of slug discharge, 2) date and time of slug discharge, 3) type of waste in the slug discharge, 4) concentration and volume of the slug discharge, and 5) describe the corrective actions taken to prevent future slug discharges.

Written notification is required to the County within five (5) days, pursuant to 40 CFR 403.8 (f)(2)(v).

4. Upset Noncompliance

The permittee shall notify the County by phone, within 24 hours of first becoming aware, that a process upset has occurred. "Upset" is defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit discharge limitations because of factors beyond the reasonable control of the Industrial User. The permittee shall submit to the County a written notification within five days, which includes the following information:

a. A description of the discharge to sanitary sewer and cause of noncompliance;

b. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue;

c. Steps being taken and/or planned to reduce, eliminate and prevent recurrence of the noncompliance.

5. Notification of Changed Discharge

In accordance with 40 CFR 403.12 (j), the permittee shall promptly notify the County in advance of any substantial changes in the volume or character of pollutants in its discharge, or having the potential to affect the character, including the listed or characteristic hazardous wastes for which the permittee has submitted initial notification under 40 CFR 403.12 (p).

C. **PERMIT ITEMS**

1. Permit Re-issuance

a. Re-application

The permittee must submit an application for permit re-issuance, in the form of a completed Industrial-Commercial Waste Questionnaire, to the County no later than 90 days prior to the expiration date of the permit.

b. Re-issuance

Upon timely application for re-issuance of a permit in accordance with paragraph a, the expired permit shall be automatically extended until a final decision regarding the application is made by the County Agency.

2. Permit Modification

The County Agency reserves the right to modify this permit, in whole or in part, during its term in order to:

a. Incorporate a new pollutant, process or wastestream proposed for discharge.

b. Indicate that the volume of wastewater discharged increased by more than 50% from that upon which the current permit is based.

Permit Items - Cont'd

c. Reflect new or revised federal or state requirements and/or objectives of the County's Industrial Pretreatment Program.

3. Nontransferability of Permit

Wastewater Discharge Permits are issued to a specific user for a specific operation and may not be assigned or transferred to another discharger or to another location without the prior written approval of the County.

4. Permit Revocation, Surrender, and Termination of Discharge

a. Revocation:

It is understood and agreed that the permit and rights granted herein are subject to revocation, after notice and an opportunity for a hearing, for the following reasons:

i. Violation of the terms and conditions set forth, attached, and made a part of this permit.

ii. Violation of any applicable local ordinances, Wayne County Sewer Use Ordinance, or applicable State and Federal Laws, statutes, or regulations.

The notice of revocation shall set forth specifically the grounds for which the revocation is sought, a place and time for a hearing, granting the permittee a reasonable time to prepare. The permittee hereby agrees that notice may be perfected by certified mail, postage prepaid and properly addressed to the permittee at the address listed in this permit, subject to requirements of the enforcement procedures adopted by the county.

b. Permit Surrender and Termination of Discharge

It is further understood, that a violation of any of the terms or conditions of this permit may, after notice and opportunity for a hearing, operate to suspend and annul any and all rights acquired under this permit and the permit holder shall surrender the permit and cease all wastewater discharges and remove any connection made pursuant to this permit.

WAYNE COUNTY DIVISION OF PUBLIC WORKS
CLASS D WASTEWATER DISCHARGE PERMIT

PRETREATMENT REQUIREMENTS OF PERMIT NO. D-11311

ATTACHMENT #1

Appendix A
Local Discharge Limitations

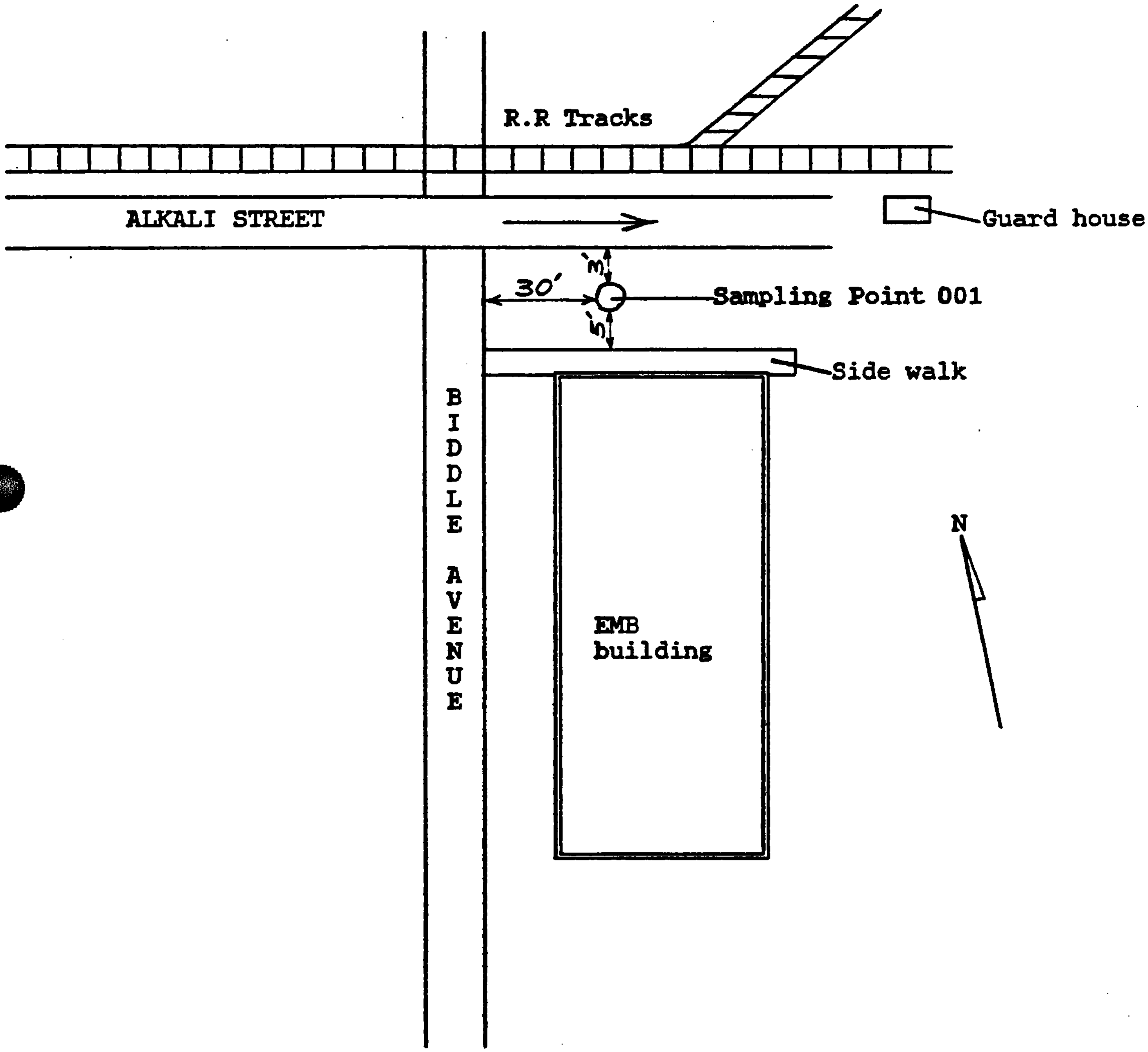
No.	Parameters	Limit (Average Daily Concentration)	
1.	Fats, Oil & Grease	100.0	mg/l
2.	Phenolics, Total	0.5	mg/l
3.	Arsenic	1.0	mg/l
4.	Cadmium	2.0	mg/l
5.	Total Chromium	25.0	mg/l
6.	Copper	4.5	mg/l
7.	Lead	1.0	mg/l
8.	Mercury	0.005	mg/l
9.	Nickel	5.0	mg/l
10.	Silver	2.0	mg/l
11.	Zinc	15.0	mg/l
12.	Cyanide (total)	2.0	mg/l
13.	Aroclor 1260 Polychlorinated Biphenyls	0.0005	mg/l
14.	Total Polychlorinated Biphenyls	0.001	mg/l

Additional Parameters, per WCSUO:

	BOD 5 - Biochemical Oxygen Demand, 5 day	275	mg/l
	Total Phosphorus	12.0	mg/l
	Total Suspended Solids (T.S.S.)	350	mg/l
	pH	5.0 - 9.5	

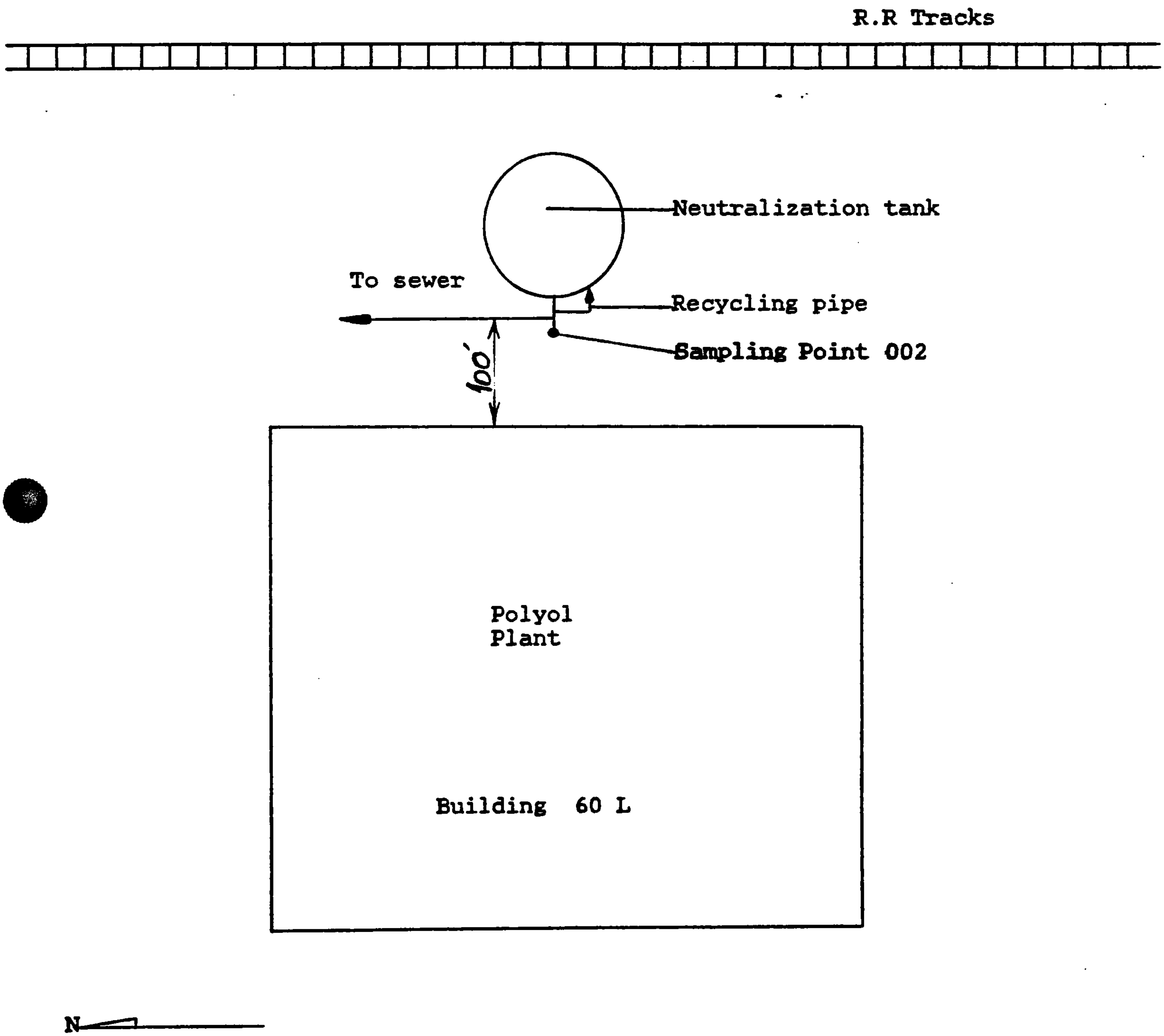
BASF CORPORATION

Attachment "C"
Sampling location 001
Alkali Street



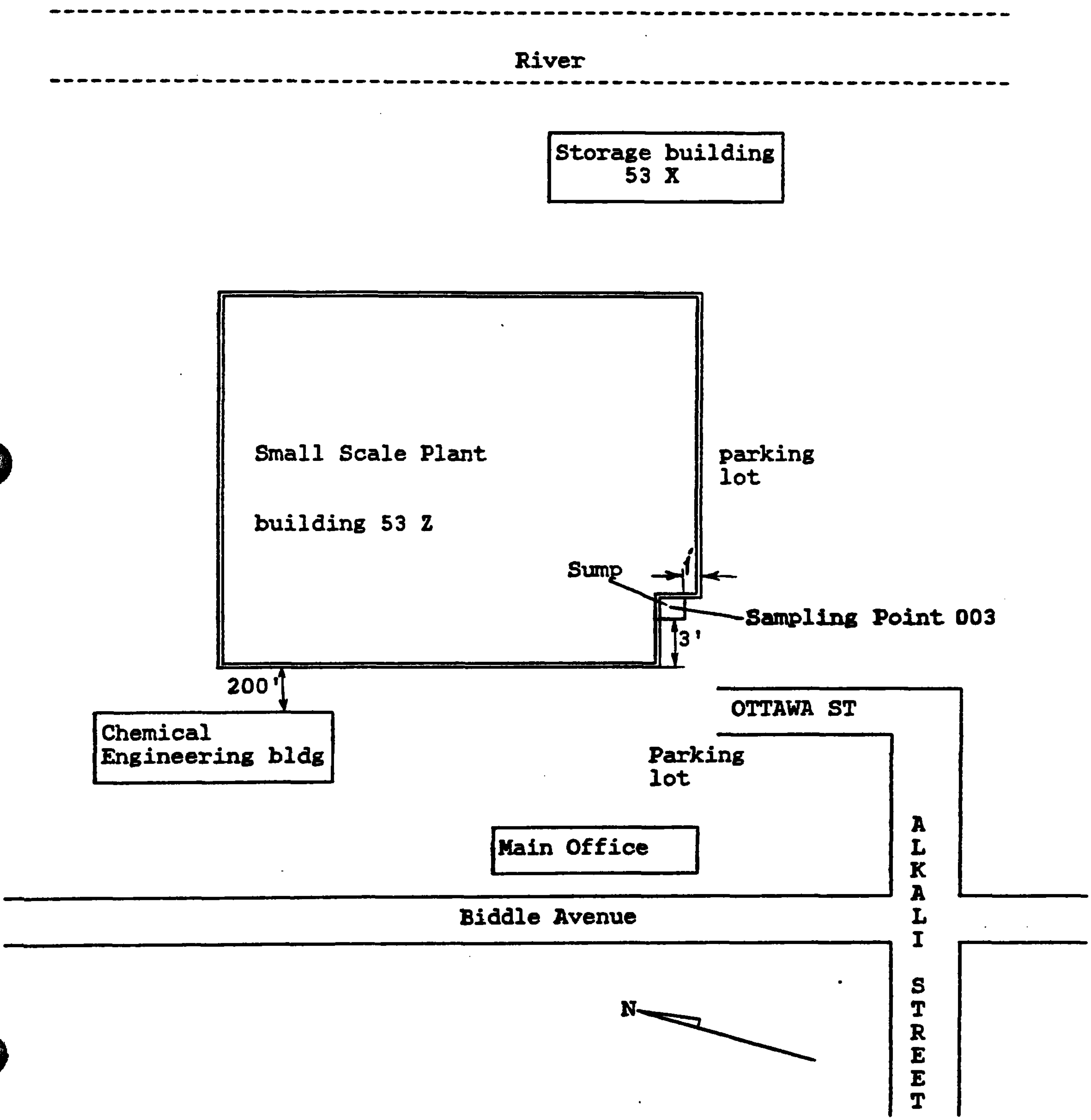
BASF CORPORATION

Attachment "C"
Sample Point 002
Polyol Plant



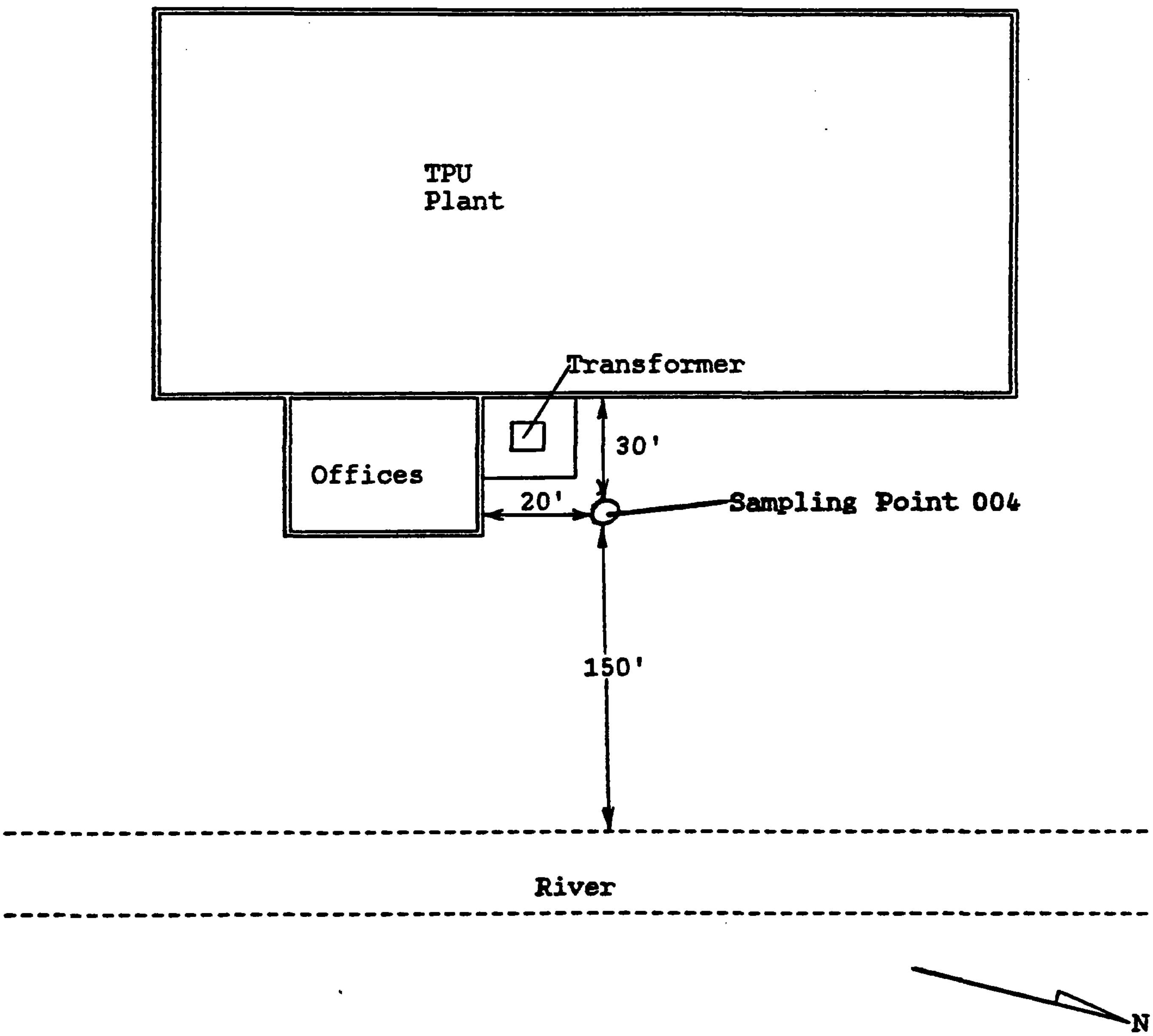
BASF CORPORATION

Attachment "C"
Sampling Point 003
Small Scale Plant



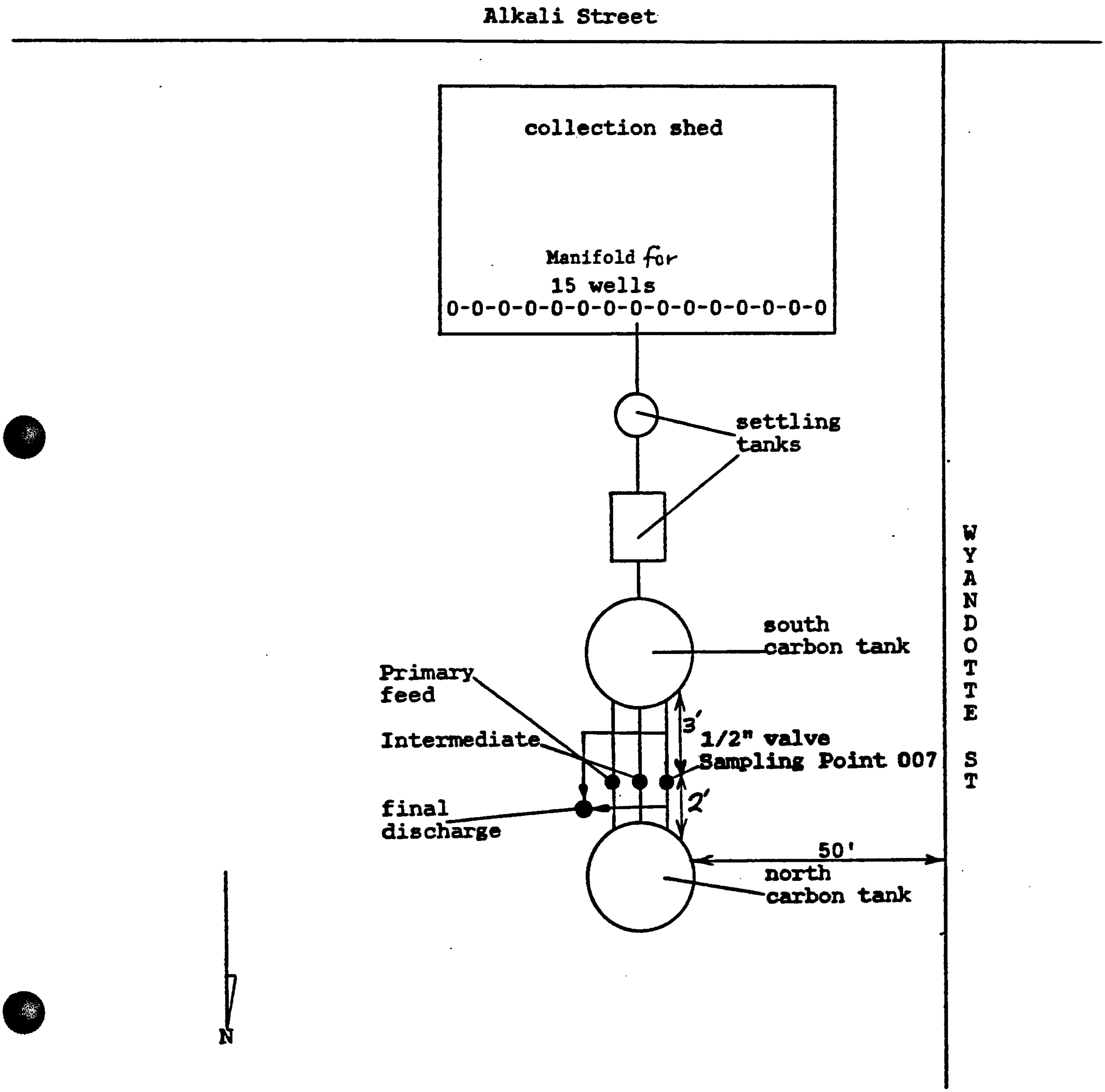
BASF CORPORATION

Attachment "C"
Sampling Point 004
TPU Plant



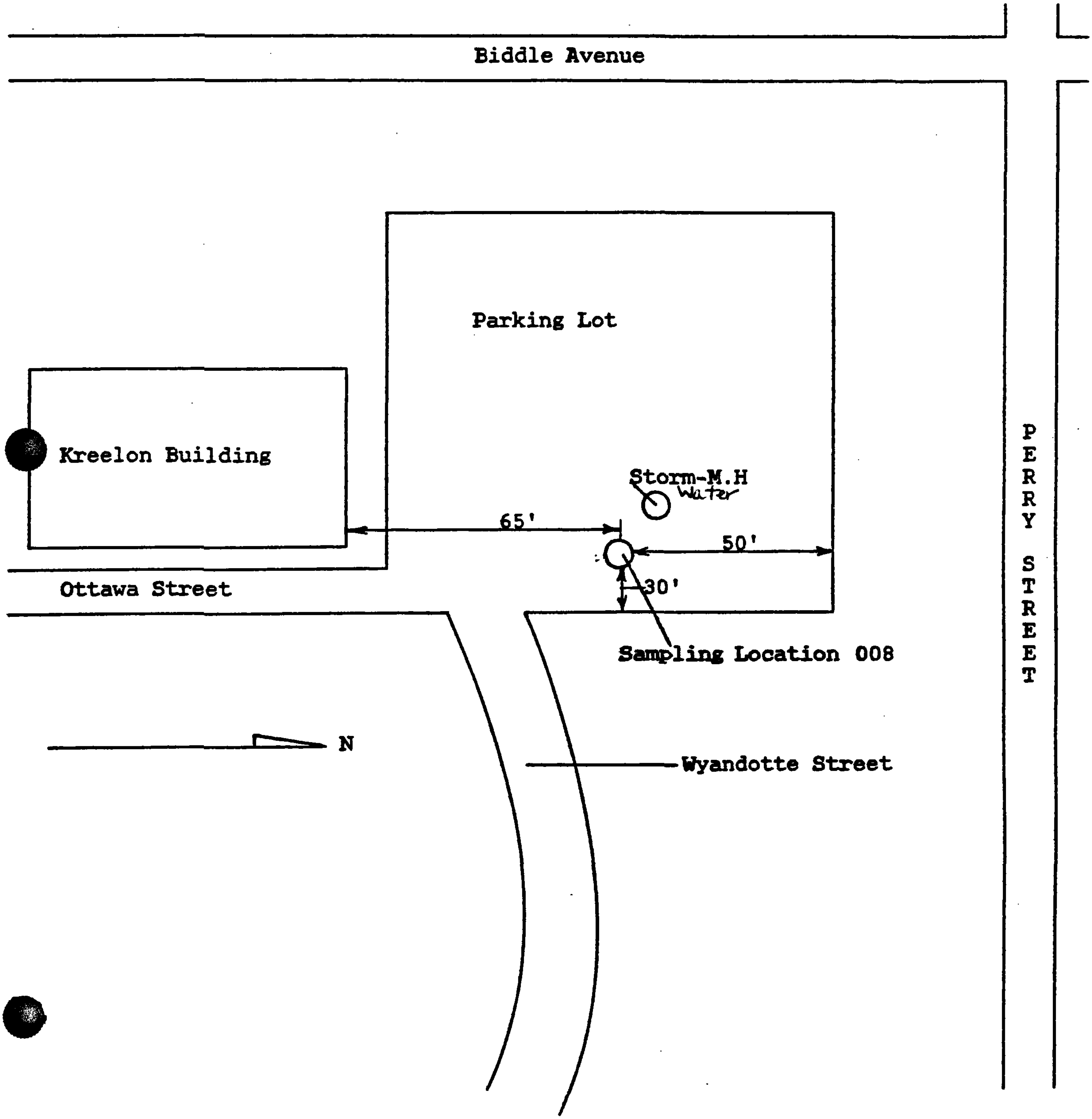
BASF CORPORATION

Attachment "C"
Sampling Location 007
North Works Groundwater Remediation System



BASF CORPORATION

Attachment "C"
Sampling Location 008
Main Sampling Point #2 - Perry Street



APPENDIX F

EXHIBIT 9

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 092 301 496

April 21, 1994

bc: DHEasley
GTDurst
LBWashington

File: POTW - Groundwater
Self-Monitoring Reports

Circ: CDL, DPT

Mr. Roger Gillard
Wayne County Office of Public Services
Department of Environment
3501 Henry Ruff Road
Westland, MI 48185

Dear Mr. Gillard:

RE: Permit D-11311, D-11321, and S-11306

Attached please find completed Periodic Compliance Report (PCR) forms and supporting documentation for the self-monitoring results generated during the first quarter of 1994.

North Works

Suggested revision for the PCR form: The description for Sample 001 should be changed from EMB M.H. to Main Gate M.H. since BASF has ceased all manufacturing and business operations of the EMB Division.

South Works

Suggested revision for the PCR forms: add descriptions for the sample points - Wye Street for 008 and Pine Street for 009.

A separate letter to address pH excursions at the South Works is pending.

Yours very truly,

Charlie

Charles E. Anderson
Ecology Services Engineer

CEA/alg
Attachments

cc: T. Galloway
Wayne County Office of Public Services

WAYNE COUNTY DIVISION OF PUBLIC WORKS
INDUSTRIAL PRETREATMENT PROGRAM

Note:
U= Undetected

PERIODIC COMPLIANCE REPORT

Facility: BASF Corporation (~~SMD~~ Main Gate N.H) Reporting Period: Year 1994

Permit: 11311 Sample Point 001 Quarter: 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Sample type G / C	Limit mg/l Daily/Month	Monit Freq.	Report Freq.	Sample Dates / Sample Results				
					3/9/94				
BOD	C	N/A	Q	Q	882				
Nickel	C	5.0	Q	Q	U				
Phosphorus	C	N/A	Q	Q	0.57				
TSS	C	N/A	Q	Q	12				
Zinc	C	15.0	Q	Q	1.19				
pH	G	5-9.5 S.U	Q	Q	7.02				

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Process				
Cooling	420,000			E
Sanitary				
Other				
		Total:		

WAYNE COUNTY DIVISION OF PUBLIC WORKS
INDUSTRIAL PRETREATMENT PROGRAM

PERIODIC COMPLIANCE REPORT

Facility: BASF Corporation (Polyol Plant) Reporting Period: Year 1994

Permit: 11311 Sample Point 002 Quarter: 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Limit mg/l Daily/Month	Monit Freq.	Report Freq.	Sample Dates / Sample Results			
Benzene	.134/.057	S	S				
Carbon Tetrachloride	.38/.142	S	S				
Chlorobenzene	.38/.142	S	S				
1,2,4-Trichlorobenzene	.794/.196	S	S				
Hexachlorobenzene	.794/.196	S	S				
1,2-Dichloroethane	.574/.18	S	S				
1,1,1-Trichloroethane	.059/.022	S	S				
Hexachloroethane	.794/.196	S	S				
1,1-Dichloroethane	.059/.022	S	S				
1,1,2-Trichloroethane	.127/.032	S	S				
Chloroethane	.295/.11	S	S				
Chloroform	.325/.111	S	S				
1,2-Dichlorobenzene	.794/.196	S	S				
1,3-Dichlorobenzene	.38/.142	S	S				
1,4-Dichlorobenzene	.38/.142	S	S				
1,1-Dichloroethylene	.06/.022	S	S				
1,2-Trans-Dichloroethylene	.066/.025	S	S				
1,2-Dichloropropane	.794/.196	S	S				
1,3-Dichloropropylene	.794/.196	S	S				
Ethylbenzene	.380/.142	S	S				
Methylene Chloride	.17/.036	S	S				

Methyl Chloride	.295/.11	S	S				
Hexachlorobutadiene	.38/.142	S	S				
Nitrobenzene	6.40/2.23	S	S				
2-Nitrophenol	.231/.065	S	S				
4-Nitrophenol	.576/.162	S	S				
4,6-Dinitro-o-cresol	.277/.078	S	S				
Tetrachloroethylene	.164/.052	S	S				
Toluene	.074/.028	S	S				
Trichloroethylene	.069/.026	S	S				
Vinyl Chloride	.172/.097	S	S				
Total Cyanide	1.2/.42	S	S				
Total Lead	.69/.32	S	S				
Total Zinc	2.61/1.05	S	S				
pH (Grab)	5-9.5 S.U	Q	Q	See attached Table 1			

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Process	5,800	7,100		B
Cooling				
Sanitary				
Other direct discharge to Detroit River		3,000,000		E
		Total:		

Sample type is per EPA protocol. Measurements frequency is uniformly, for all above parameters, Semiannually in June and December. Actual flow measurement of wastewater at time of sampling, is required.

Flow basis for mass limit calculation was that a 7500 gallon wastewater batch is discharged from the Polyol Plant Neutralization Tank during a one day period of time.

WAYNE COUNTY DIVISION OF PUBLIC WORKS
INDUSTRIAL PRETREATMENT PROGRAM

PERIODIC COMPLIANCE REPORT

Facility: BASF Corporation (Small Scale Plt) Reporting Period: Year 1994

Permit: 11311 Sample Point 003 Quarter: 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Limit mg/l Daily/Month	Monit Freq.	Report Freq.	Sample Dates Sample Results			
Benzene	.134/.057	S	S				
Carbon Tetrachloride	.38/.142	S	S				
Chlorobenzene	.38/.142	S	S				
1,2,4-Trichlorobenzene	.794/.196	S	S				
Hexachlorobenzene	.794/.196	S	S				
1,2-Dichloroethane	.574/.18	S	S				
1,1,1-Trichloroethane	.059/.022	S	S				
Hexachloroethane	.794/.196	S	S				
1,1-Dichloroethane	.059/.022	S	S				
1,1,2-Trichloroethane	.127/.032	S	S				
Chloroethane	.295/.11	S	S				
Chloroform	.325/.111	S	S				
1,2-Dichlorobenzene	.794/.196	S	S				
1,3-Dichlorobenzene	.38/.142	S	S				
1,4-Dichlorobenzene	.38/.142	S	S				
1,1-Dichloroethylene	.06/.022	S	S				
1,2-Trans-Dichloroethylene	.066/.025	S	S				
1,2-Dichloropropane	.794/.196	S	S				
1,3-Dichloropropylene	.794/.196	S	S				
Ethylbenzene	.380/.142	S	S				

Methylene Chloride	.17/.036	S	S				
Methyl Chloride	.295/.11	S	S				
Hexachlorobutadiene	.38/.142	S	S				
Nitrobenzene	6.40/2.23	S	S				
2-Nitrophenol	.231/.065	S	S				
4-Nitrophenol	.576/.162	S	S				
4,6-Dinitro-o-cresol	.277/.078	S	S				
Tetrachloroethylene	.164/.052	S	S				
Toluene	.074/.028	S	S				
Trichloroethylene	.069/.026	S	S				
Vinyl Chloride	.172/.097	S	S				
Total Cyanide	1.2/.42	S	S				
Total Lead	.69/.32	S	S				
Total Zinc	2.61/1.05	S	S				

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Process				
Cooling				
Sanitary				
Other				
		Total:		

Sample type is per EPA protocol. Measurements frequency is uniformly, for all above parameters, Semiannually in June and December. Actual flow measurement of wastewater at time of sampling, is required.

Flow basis for mass limit calculation was 103,000 gallons per day contact sources wastewater, annual average projected flow from building 53Z, OCPSF Small Scale Facility.

WAYNE COUNTY DIVISION OF PUBLIC WORKS
INDUSTRIAL PRETREATMENT PROGRAM

PERIODIC COMPLIANCE REPORT

Facility: BASF Corporation (TPU Plant) Reporting Period: Year 1994

Permit: 11311 Sample Point 004 Quarter: 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Limit mg/l Daily/Month	Monit Freq.	Report Freq.	Sample Dates / Sample Results			
				3/30/94			
Benzene	.134/.057	S	S				
Carbon Tetrachloride	.38/.142	S	S				
Chlorobenzene	.38/.142	S	S				
1,2,4-Trichlorobenzene	.794/.196	S	S				
Hexachlorobenzene	.794/.196	S	S				
1,2-Dichloroethane	.574/.18	S	S				
1,1,1-Trichloroethane	.059/.022	S	S				
Hexachloroethane	.794/.196	S	S				
1,1-Dichloroethane	.059/.022	S	S				
1,1,2-Trichloroethane	.127/.032	S	S				
Chloroethane	.295/.11	S	S				
Chloroform	.325/.111	S	S				
1,2-Dichlorobenzene	.794/.196	S	S				
1,3-Dichlorobenzene	.38/.142	S	S				
1,4-Dichlorobenzene	.38/.142	S	S				
1,1-Dichloroethylene	.06/.022	S	S				
1,2-Trans-Dichloroethylene	.066/.025	S	S				
1,2-Dichloropropane	.794/.196	S	S				
1,3-Dichloropropylene	.794/.196	S	S				
Ethylbenzene	.380/.142	S	S				
Methylene Chloride	.17/.036	S	S				

3/30/94

Methyl Chloride	.295/.11	S	S				
Hexachlorobutadiene	.38/.142	S	S				
Nitrobenzene	6.40/2.23	S	S				
2-Nitrophenol	.231/.065	S	S				
4-Nitrophenol	.576/.162	S	S				
4,6-Dinitro-o-cresol	.277/.078	S	S				
Tetrachloroethylene	.164/.052	S	S				
Toluene	.074/.028	S	S				
Trichloroethylene	.069/.026	S	S				
Vinyl Chloride	.172/.097	S	S				
Total Cyanide	1.2/.42	S	S				
Total Lead	.69/.32	S	S				
Total Zinc	2.61/1.05	S	S				
FOG (Grab)	100	Q	Q	3.1			

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Process	7,367	16,000		M
Cooling				
Sanitary				
Other direct discharge to Detroit River		600,000		E
		Total:		

Sample type is per EPA protocol. Measurements frequency is uniformly, for all above parameters, Semiannually in June and December. Actual flow measurement of wastewater at time of sampling, is required.

Flow basis for mass limit calculation was 103,000 gallons per day contact sources wastewater, annual average projected flow from building 532, OCPSF Small Scale Facility.

WAYNE COUNTY DIVISION OF PUBLIC WORKS
INDUSTRIAL PRETREATMENT PROGRAM

PERIODIC COMPLIANCE REPORT

Facility: BASF Corporation (N.Works Groundwater) Reporting Period: Year 1994

Permit: 11311 Sample Point 007 Quarter: 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Limit mg/l Daily	Monit Freq.	Report Freq.	Sample Dates Sample Results				
				See attached Table 2				
1,2-Dichloroethane	1.4	Q	Q					
1,2-Dichloropropane	.25	Q	Q					
Methylene Chloride	.25	Q	Q					
Chloroform	.25	Q	Q					

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Process				
Cooling				
Sanitary				
Other Groundwater	4726	20,465	417,562	M
Service Water	2,502	14,410	217,623	M
		Total:		

PERIODIC COMPLIANCE REPORT

Facility: BASF Corporation (Kreelon M.H)

Permit: 11311 Sample Point 008

Reporting Period: Year 1994

Quarter: 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Sample type G / C	Limit mg/l Daily/Month	Monit Freq.	Report Freq.	Sample Dates / Sample Results				
					3/16/94		3/22/94		
BOD	C	N/A	Q	Q	28				
TSS	C	N/A	Q	Q	420				
pH	G	5-9.5 S.U	Q	Q			7.76		

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Process				
Cooling				
Sanitary				
Other				
		Total:		

WAYNE COUNTY DIVISION OF PUBLIC WORKS
INDUSTRIAL PRETREATMENT PROGRAM

PERIODIC COMPLIANCE REPORT

Facility: BASF-S Works GW Remediation

Reporting Period: Year 1994

Permit: 11321 **Site:** 008 (Wye Street)

Quarter: 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Sample type G / C	Limit mg/l Daily	Monit Freq.	Report Freq.	Sample Dates / Sample Results				
					3/7/94				
BOD	G	N/A	Q	Q	8				
Chloroform	G	.25	Q	Q	U				
Phenol	G	.5	Q	Q	U				
pH	G	5-9.5 su	Q	Q	See attached Table 3				

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Process (Ground water)	1,626	12,120	142,522	M
Other (Service Water)	130	550	11,030	M
		Total:		

WAYNE COUNTY DIVISION OF PUBLIC WORKS
INDUSTRIAL PRETREATMENT PROGRAM
Periodic Compliance Report

Facility: BASF S-Works GW Remediation — **Reporting Period:** Year 1994

Permit: 11321 **Site:** 009 (Pine Street) — **Quarter:** 1 2 3 4 (circle one)

I. Summary of Self-Monitoring Data:

Parameter	Sample type G / C	Limit mg/l Daily	Monit Freq.	Report Freq.	Sample Dates / Sample Results				
					3/7/94				
BOD	G	N/A	Q	Q	1,550				
Phenol	G	.5	Q	Q	0.069				
pH	G	5-9.5 S.U	Q	Q	See attached Table 3				
Chloroform	G	0.25	Q	Q	0.13				
1,1-Dichloroethylene		.15	Q	Q	0.3				
1,2-Dichloropropane		.25	Q	Q	19				
Trichloroethylene		1.0	Q	Q	73				
Tetrachloroethylene		.25	Q	Q	1.5				
Vinyl Chloride		.008	Q	Q	0.71				
t 1,2-Dichloroethylene		.75	Q	Q	11				
bis-(2-Chloroisopropyl) ether		monitor only	Q	Q	5.6				
Bromomethane		.025	Q	Q	U				
Methylene Chloride		.25	Q	Q	0.091				

D- Daily, M- Monthly, Q- Quarterly, S- Semi Annually, Y- Yearly,
G- Grab, C- Composite, S.U- Standard Unit

II. Flow Data:

	Avg., GPD	Max., GPD	Total discharge for report period	Method of measurement (M) Measured (E) Estimated (B) Batch
Groundwater Process	905	5,037	78,654	M
Service Water Other	63	420	5530	M

Total: ________

PERIODIC COMPLIANCE REPORT

Facility: BASF Corporation

Reporting Period: 1Q94

Permit: S-11306

Sample Point: 001 (Main Gate)

I. Summary of Self-Monitoring Data:

Parameter	Sample Type	Limit (mg/l)	Monitoring Frequency	Sample Date	Result (mg/l)
Dimethyl Sulfoxide	24-hour composite	13.5	Quarterly	03/25/94	<0.01

II. Flow Data:

Equipment	Number Of Cleaning Events
Methanol Recovery Column	2
Zinc Chloride Extraction System	0

PERIODIC COMPLIANCE REPORT

BASF CORPORATION
(Company Name)

III. Additional Requirements

1. Attach copies of the individual analytical reports for review.

2. If any pollutant was monitored more frequently than required using procedures prescribed in 40 CFR Part 136, include results in Section I.

3. Does sampling detect any violations of permit limitations? __X *__ YES ______ NO

4. If answer to Question 3 above is "YES," was notification provided to Wayne County DPW - IPP Section within 24 hours of becoming aware of the violation?

   ______ YES ______ NO

5. Re-sampling: (Answer only if Question 3 is "YES.")

   a. Re-sampling performed and results submitted to Wayne County within 30 days of becoming aware of the violation(s)?

      __X__ YES ______ NO

   b. Re-sampling not required due to:

      ______ (i) County samples monthly.

      ______ (ii) County sampled between initial sampling and time of becoming aware of the violations.

IV. Nature of Pollutants

1. Have raw material - type and/or source of supply - changed during the reporting period? NO

2. If answer above is "YES," identify all new pollutants.

______________________ ______________________ ______________________

______________________ ______________________ ______________________

* Note: Letter of explanation pending.

PERIODIC COMPLIANCE REPORT

BASF CORPORATION
(Company Name)

V. **CERTIFICATION STATEMENT:**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Mgr. Quality & Ecology Services Title	4/22/94 Date

WSS/sv
12/01/92

TABLE 1
SELF-MONITORING DATA FOR POLYOLS PLANT
FIRST QUARTER 1994

Date	pH	Date	pH	Date	pH
01/02/94	6.6	02/01/94	7.6	03/01/94	7.0
01/04/94	6.6	02/02/94	8.3	03/02/94	8.5
01/06/94	7.2	02/03/94	7.0	03/04/94	8.9
01/08/94	8.7	02/04/94	7.7	03/06/94	6.7
01/10/94	7.9	02/06/94	6.6	03/06/94	6.6
01/11/94	6.8	02/07/94	7.3	03/08/94	6.6
01/12/94	7.4	02/07/94	7.9	03/09/94	8.2
01/14/94	6.3	02/10/94	8.9	03/10/94	7.1
01/16/94	6.8	02/11/94	6.9	03/10/94	6.3
01/17/94	6.6	02/12/94	6.6	03/10/94	7.5
01/19/94	8.8	02/13/94	7.9	03/13/94	7.4
01/19/94	7.6	02/15/94	6.4	03/14/94	7.0
01/22/94	6.9	02/16/94	5.6	03/15/94	7.3
01/23/94	7.1	02/18/94	6.7	03/16/94	7.5
01/24/94	7.6	02/19/94	6.8	03/17/94	7.2
01/26/94	6.6	02/20/94	8.4	03/19/94	7.8
01/27/94	8.6	02/22/94	7.3	03/20/94	6.4
01/28/94	6.8	02/21/94	8.0	03/22/94	6.4
01/30/94	6.5	02/23/94	7.4	03/22/94	8.9
		02/24/94	6.9	03/24/94	7.8
		02/25/94	6.4	03/26/94	6.4
		02/26/94	7.3	03/27/94	7.3
		02/27/94	7.5	03/27/94	6.4
		02/28/94	8.5	03/29/94	7.3
				03/30/94	7.6

Summary

minimum	5.6
average	7.3
maximum	8.9

C.E. Anderson

04/21/94

TABLE 2
SELF-MONITORING DATA FOR
NORTH WORKS GROUNDWATER STATION
FIRST QUARTER 1994

	Concentration (ppb)			
Date	DCM	PDC	DCE	CF
01/07/94	<MDL	<MDL	<MDL	<MDL
01/12/94	<MDL	<MDL	<MDL	<MDL
01/25/94	<MDL	<MDL	<MDL	<MDL
02/04/94	<MDL	<MDL	<MDL	<MDL
02/14/94	<MDL	<MDL	<MDL	<MDL
02/21/94	<MDL	<MDL	<MDL	<MDL
03/03/94	<MDL	11	<MDL	<MDL
03/07/94	<MDL	<MDL	<MDL	<MDL
03/14/94	<MDL	<MDL	<MDL	<MDL
03/21/94	<MDL	<MDL	<MDL	<MDL
03/28/94	<MDL	<MDL	<MDL	<MDL

Notes:

DCE = 1,2-Dichloroethane
PDC = 1,2-Dichloropropane
DCM = Methylene Chloride
CF = Chloroform
MDL = Method Detection Limit

C.E. Anderson 04/21/94

TABLE 3
SELF–MONITORING DATA FOR SOUTH WORKS
FIRST QUARTER 1994

	pH (Std. Units)	
Date	Pine	Wye
01/01/94		
01/02/94		
01/03/94	13.1	9.3
01/04/94		
01/05/94	13.1	9.8
01/06/94	13.4	9.1
01/07/94	12.7	9.0
01/08/94		
01/09/94		
01/10/94	13.7	9.3
01/11/94	12.8	9.4
01/12/94	13.3	9.4
01/13/94	12.6	9.2
01/14/94	13.3	9.2
01/15/94		
01/16/94		
01/17/94	13.3	9.3
01/18/94	12.2	8.8
01/19/94		
01/20/94	12.0	8.9
01/21/94	12.1	
01/22/94		
01/23/94		
01/24/94	12.3	
01/25/94	11.2	
01/26/94	12.0	8.6
01/27/94	12.0	
01/28/94		
01/29/94		
01/30/94		
01/31/94	11.6	8.6

	pH (Std. Units)	
Date	Pine	Wye
02/01/94	11.8	8.6
02/02/94	12.1	8.9
02/03/94	10.6	8.7
02/04/94	11.9	8.9
02/05/94		
02/06/94		
02/07/94	12.1	9.2
02/08/94	11.1	
02/09/94	11.7	8.8
02/10/94	12.1	
02/11/94	11.6	9.0
02/12/94		
02/13/94		
02/14/94	12.1	9.0
02/15/94	11.6	8.7
02/16/94	12.2	8.7
02/17/94	11.8	8.9
02/18/94	11.1	9.0
02/19/94		
02/20/94		
02/21/94	6.8	8.8
02/22/94	6.9	8.9
02/23/94	7.1	8.7
02/24/94	6.9	8.7
02/25/94	6.9	8.7
02/26/94		
02/27/94		
02/28/94	6.9	8.7

	pH (Std. Units)	
Date	Pine	Wye
03/01/94	7.1	8.8
03/02/94	7.0	8.7
03/03/94	7.1	8.7
03/04/94	7.7	8.8
03/05/94		
03/06/94		
03/07/94	11.9	8.7
03/08/94	7.3	8.7
03/09/94	7.3	8.6
03/10/94	7.2	8.9
03/11/94	7.4	9.3
03/12/94		
03/13/94		
03/14/94	11.4	11.8
03/15/94	7.1	7.1
03/16/94	11.9	11.8
03/17/94	11.8	12.0
03/18/94	7.3	11.7
03/19/94		
03/20/94		
03/21/94	11.2	
03/22/94	7.0	9.1
03/23/94	7.3	11.8
03/24/94	6.9	8.8
03/25/94	7.0	8.8
03/26/94		
03/27/94		
03/28/94	8.7	7.0
03/29/94	8.7	7.0
03/30/94	7.1	11.8
03/31/94	6.8	11.6

Summary

	Pine	Wye
minimum	6.8	7.0
average	10.2	9.2
maximum	13.7	12.0

SHRADER
Analytical and Consulting
LABORATORIES INC.

ANALYTICAL REPORT

Customer : BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MICHIGAN 48192

ATTN: MR. C. E. ANDERSON

Project : C799

Sample ID : MAIN GATE 3/9/94 - GRAB & COMPOSITE

Analysis : EPA METHODS

Date : March 23, 1994

Parameter	Result	Unit	D.L.
pH	7.02	----	---
TSS	12	mg/L	1
Nickel	N.D.	mg/L	0.05
Zinc	1.19	mg/L	0.005
Phosphorus	0.57	mg/L	0.04
BOD	882	mg/L	4

Approved George P. Baker
George Baker, QA/QC

Verified Laura J. Bruske
Laura J. Bruske

D.L. = Detection Limit
N.D. = Not Detected

LJB/rac

3814 VINEWOOD · DETROIT, MICHIGAN 48208 (313) 894-4440 · FAX (313) 894-4489

SHRADER
Analytical and Consulting
LABORATORIES INC.

A N A L Y T I C A L   R E P O R T

Customer : BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MICHIGAN 48192

ATTN: MR. C. E. ANDERSON

Project : C878

Sample ID : TPU SYNTHESIS - GRAB 3/30/94

Description : WATER

Analysis : FATS, OIL & GREASE (FOG)

Date Received : March 30, 1994

Analysis Date : April 4, 1994

Report Date : April 4, 1994

Parameter	Result	D.L.	Unit	Method
FOG	3.1	1	mg/L	413.1

Approved George P. Baker Jr.
George Baker, QA/QC

Analyst Patricia Hancox
Patricia Hancox

D.L. = Detection Limit

PH/rac

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489

SHRADER
Analytical and Consulting
LABORATORIES INC.

ANALYTICAL REPORT

Customer : BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MICHIGAN 48192

ATTN: MR. C. E. ANDERSON

Project # : C823

Description : KREELON - 3/16/94 COMPOSITE

Matrix : WATER

Analysis : TOTAL SUSPENDED SOLIDS &
BIOCHEMICAL OXYGEN DEMAND(5)

Sampling Date : March 16, 1994

Analysis Date : March 17, 1994

Report Date : March 24, 1994

Parameter	RESULT	Unit	D.L.	Method
TSS	420	mg/L	1	160.2
BOD(5)	28	mg/L	4	SM17-5210

Approved George P Baker
George Baker, QA/QC

Verified Laura J. Bruske
Laura J. Bruske

D.L. = Detection Limit

LJB/rac

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489

SHRADER
Analytical and Consulting
LABORATORIES INC.

A N A L Y T I C A L   R E P O R T

Customer : BASF CORPORATION
1609 BIDDLE AVENUE
WYANDOTTE, MICHIGAN 48192

ATTN: MR. C. E. ANDERSON

Project : C847

Sample ID : KREELON 3/22/94 - GRAB

Description : 1ST QUARTER POTW GENERAL SELF-MONITORING

Analysis : EPA METHOD 150.1

Date Received : March 22, 1994

Analysis Date : March 22, 1994

Report Date : March 23, 1994

Parameter	Result	Analyst
pH	7.76	PH

Approved George P. Baker
George Baker, QA/QC

Verified Laura J. Bruske
Laura J. Bruske

LJB/rac

3814 VINEWOOD · DETROIT, MICHIGAN 48208 · (313) 894-4440 · FAX (313) 894-4489

ANALYTICAL PROCEDURE:

The SOUTH WORKS QUARTERLY SELF MONITORING samples for 1994 labelled WYE STREET 3/7/94 and PINE STREET 3/7/94 (SL #C79001 and C79002, respectively) were analyzed for biochemical oxygen demand (BOD_5, Method SM17-5210) and total phenols (Method 420.1).

In addition the WYE STREET sample was also analyzed for chloroform according to EPA Method 624.

The PINE STREET sample was extracted and analyzed for bis(2-chloroisopropyl) ether according to EPA Method 625 and for various volatile organics according to EPA Method 624.

RESULTS:

Complete quantitation summaries and the chromatograms generated during the organic analyses are enclosed.

BOD and phenols results are listed below. Units are in milligrams/Liter (mg/L).

PARAMETER	WYE STREET	PINE STREET	D.L.
BOD	8	1550	4
Phenols	N.D.	0.069	0.005

D.L. = Detection Limit
N.D. = Not Detected

LJB/rac

Report date : 03-07-1994

Sample size : 44 ml

DATA file : C79001A
Description : WYE STREET 3/7/94
Sample submitted by : BASF WYANDOTTE
Analyzed on 03-07-1994 by ROBM   Report prepared by ROBM

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
CHLOROFORM	N.D.	2

N.D. = Not detected   TOTAL   0

SHRADER LABORATORIES, INC.

Report date : 03-09-1994 QUANTITATION SUMMARY

DATA file : C79002AA Sample size : 750 ml
Description : PINE ST. 3/7/94 SOUTH,WORKS,POTW,QUARTERLY
Sample submitted by : BASF WYANDOTTE
Analyzed on 03-09-1994 by ROBG Report prepared by BRUL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
bis(2-CHLOROISOPROPYL)ETHER	5,600	10
TOTAL	5,600	

SHRADER LABORATORIES, INC.

QUANTITATION SUMMARY

Report date : 03-08-1994

Sample size : 5 ml

DATA file : C79002B
Description : PINE STREET 3/7/94
Sample submitted by : BASF WYANDOTTE
Analyzed on 03-07-1994 by ROBM   Report prepared by BRUL

COMPOUND	CONCENTRATION Micrograms/Liter	Det.Limit
BROMOMETHANE	N.D.	30
CHLOROFORM	130	10
1,1-DICHLOROETHENE	300	20
t-1,2-DICHLOROETHENE	11,000	20
1,2-DICHLOROPROPANE	19,000	20
METHYLENE CHLORIDE	91	10
TETRACHLOROETHENE	1,500	10
TRICHLOROETHENE	73,000	10
VINYL CHLORIDE	710	20
TOTAL	106,000	

N.D. = Not detected

BASF CORPORATION

RESEARCH SERVICES

BASF Restricted Document

ANALYTICAL REPORT

PAGINATION : 129216
PROJECT NO. : 5V0430

PAGINATION :	129216		
DESCRIPTION :	WYANDOTTE		
PROJECT NO. :	5V0430		
REQUESTOR/ID :	NEUBAUER, LAURA J. / 19470	Ext:	6367
COST CENTER :	20270		
COORDINATOR/ID:	MARTIN, MICHAEL J / 13283	Ext:	6878
DATE ENTERED :	03/28/94		
DATE FINISHED :	04/04/94		
COPIES TO :	C. ANDERSON		

INFORMATION/INSTRUCTIONS

32242 DMSO analysis

RESULTS

DMSO Analysis by GC/FID -- L. Neubauer
==
The sample was injected neat into the GC/FID with a DB-Wax 30m, .25um I.D. column. Calibration was made using external standards of DMSO.

RESULTS: <10 ug DMSO/ml in #32242
Matrix Spike recovery @10.1 ug/ml = 96.%

APPROVAL: Laura Neubauer
MJM

APPENDIX F

EXHIBIT 10

POTW Excursions Since 1987

Month	Parameter	Annual Total
02/87	pH	2
11/87	pH	
01/88	pH	1
07/89	pH	2
11/89	pH	
10/92	iron	3
06/92	toluene	
04/92	nickel	
02/93	1,2-dichloropropane	3
05/93	fats, oils, and grease	
06/93	phenol	

Note: excursions above limits for BOD, TSS, and phosphorus are not shown since they are surchargeable

APPENDIX F

EXHIBIT 11

APPENDIX F

EXHIBIT 12

Item [illegible].5

BASF Wyandotte Corporation

ANALYTICAL REQUISITION — QUALITY AND POLLUTION CONTROL

File No. ______

Sample: North Plant Extraction Wells   Laboratory No. ______

No. Samples ______   Project No. ______   Date: April 13, 1988

SAMPLE INFORMATION (WHERE FROM AND WHY)

All Results are in PPM

ANALYSIS REQUIRED:

SAMPLE IDENTIFICATION	RESULTS								
	$MeCl_2$	$CHCl_3$	EDC	PDC	Toluene	[redacted]	bis(2chloro-isopropyl) Ether		
#1									
#2									
#3									
#4									
4-14-88 #5	89	3,072	3,134	262,441	284		59,380		
4-14-88 #6	0	208	100	2,659	17		1,206		
4-14-88 #7	218	10	264	775	26		99		
4-14-88 #8	2	3	42	160	<1		6		
4-14-88 #9	131	6,844	4,940	425,819	214		201,867		

Requested By: H.D. Roush

Send Copies To: L. Anderson - Lab.

Analyst: F. Manore

Time Required ______

Date Completed ______

L. Anderson
CHIEF CHEMIST

F 875 REV. 2/76

BASF Wyandotte Corporation

File No.

ANALYTICAL REQUISITION – QUALITY AND POLLUTION CONTROL

Sample North Plant Extraction Wells.

Laboratory No.

No. Samples

Project No.

Date April 13, 1988

SAMPLE INFORMATION (WHERE FROM AND WHY)

All Results are in PPM

ANALYSIS REQUIRED:

SAMPLE IDENTIFICATION	RESULTS								
	Me Cl_2	$CHCl_3$	EDC	PDC	Toluene	bis(2 chloro-isopropyl) Ether			
4-13-88 #10	164	9,659	16,668	409,309	160	161,852			
4-14-88 #11	1	5	6	259	<1	42			
4-14-88 #12	1	2	1	198	2	64			
4-14-88 #13	76	5,856	3,677	109,759	256	144,259			
#14									
#15									

Requested By H. D. Roush

Send Copies To L. Anderson - Lab.

Analyst F. Manore

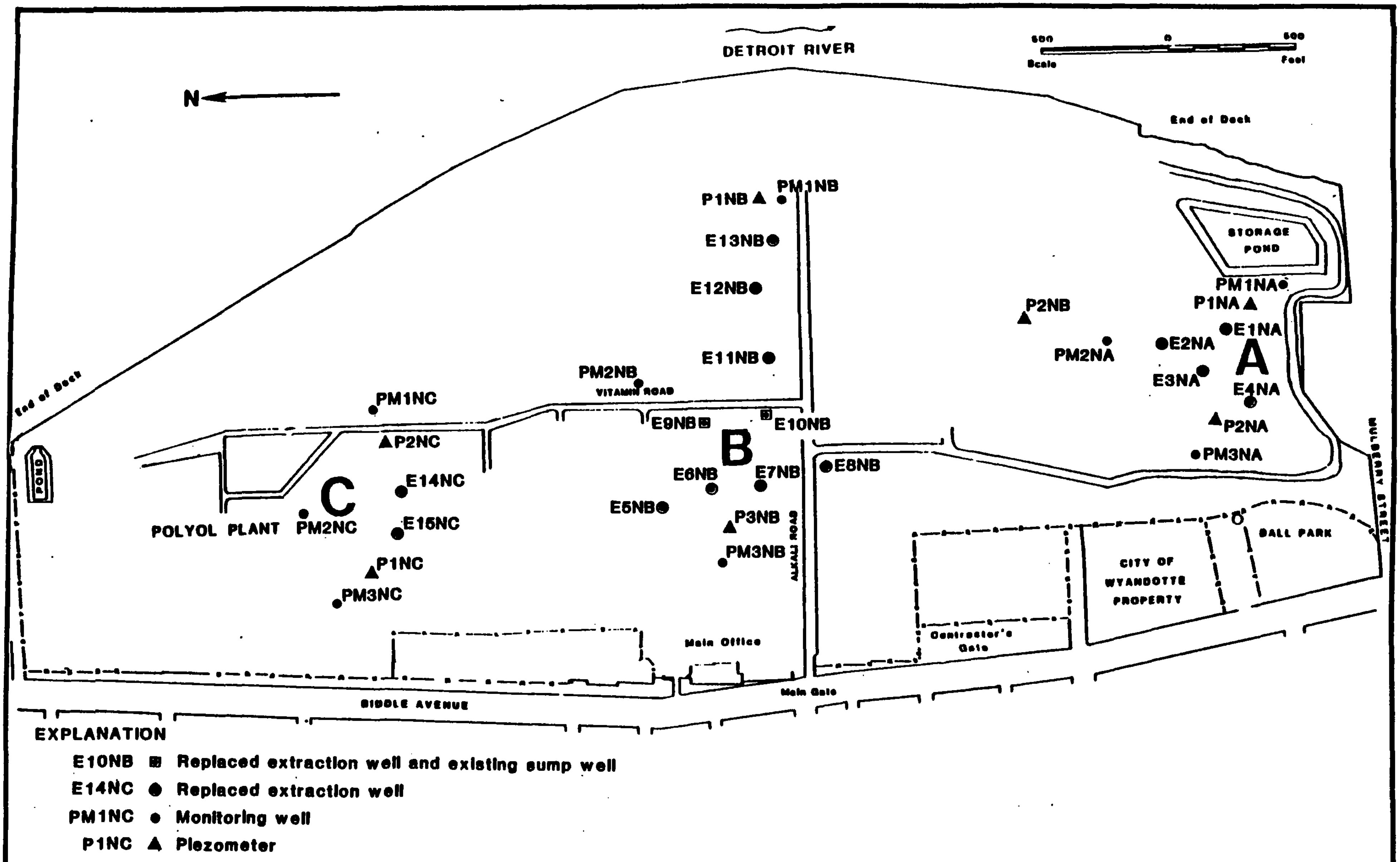
Time Required

Date Completed

L. Anderson

CHIEF CHEMIST

F 875 REV. 2/76



S. S. PAPADOPULOS & ASSOCIATES, INC.
CONSULTING GROUND-WATER HYDROLOGISTS

LOCATION OF EXTRACTION WELLS,
MONITORING WELLS AND PIEZOMETERS, NORTH WORKS

FIGURE
1

APPENDIX T

EXHIBIT 13

Item 6.1

Figure 13 is a bar chart which shows the mass flowrates for removal of contaminants of concern at the North Works Groundwater Collection and Treatment System. It illustrates that PDC is the primary contaminant of concern in the groundwater. This correlates with our knowledge about the production process from which the pollutants originated: 70% of the byproducts from the production of propylene oxide by the chlorohydrin method is PDC. For this reason, the subsequent reports in this section focus on PDC.

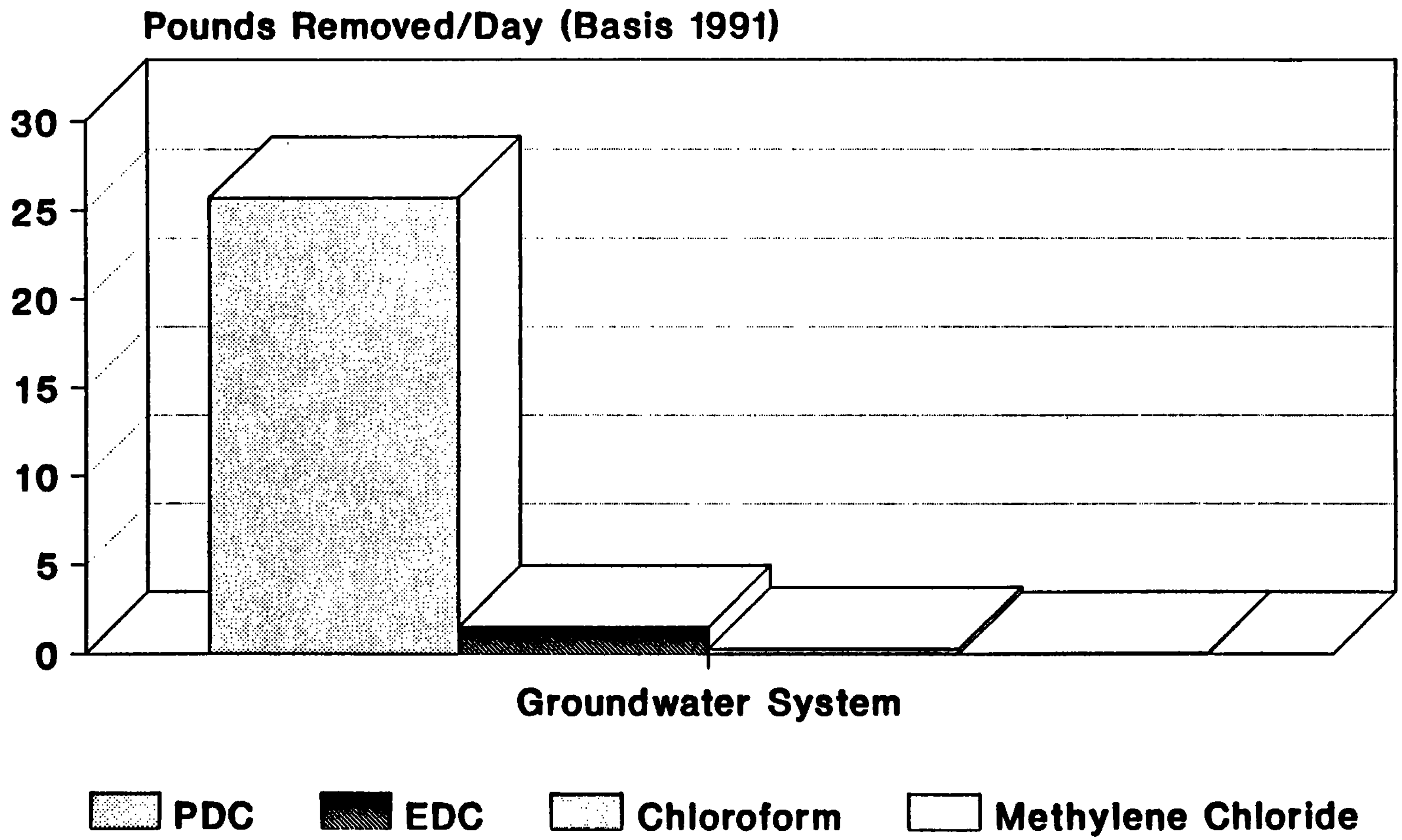
Figure 14 is a bar chart which shows the average annual concentration of PDC in extracted groundwater fed to the North Works Groundwater Collection and Treatment System during 1987 through 1991. During this time period, the groundwater PDC concentration has decreased by 81%.

Figure 15 is a bar chart which shows the total mass of PDC in extracted groundwater fed to the North Works Groundwater Collection and Treatment System during 1987 through 1991. During this time period, the annual mass of extracted PDC has decreased by 91%.

Figure 16 is a bar chart which shows the volume of extracted groundwater fed to the North Works Groundwater Collection and Treatment System during 1987 through 1991. During this time period, the annual volume of extracted groundwater has decreased by 62%.

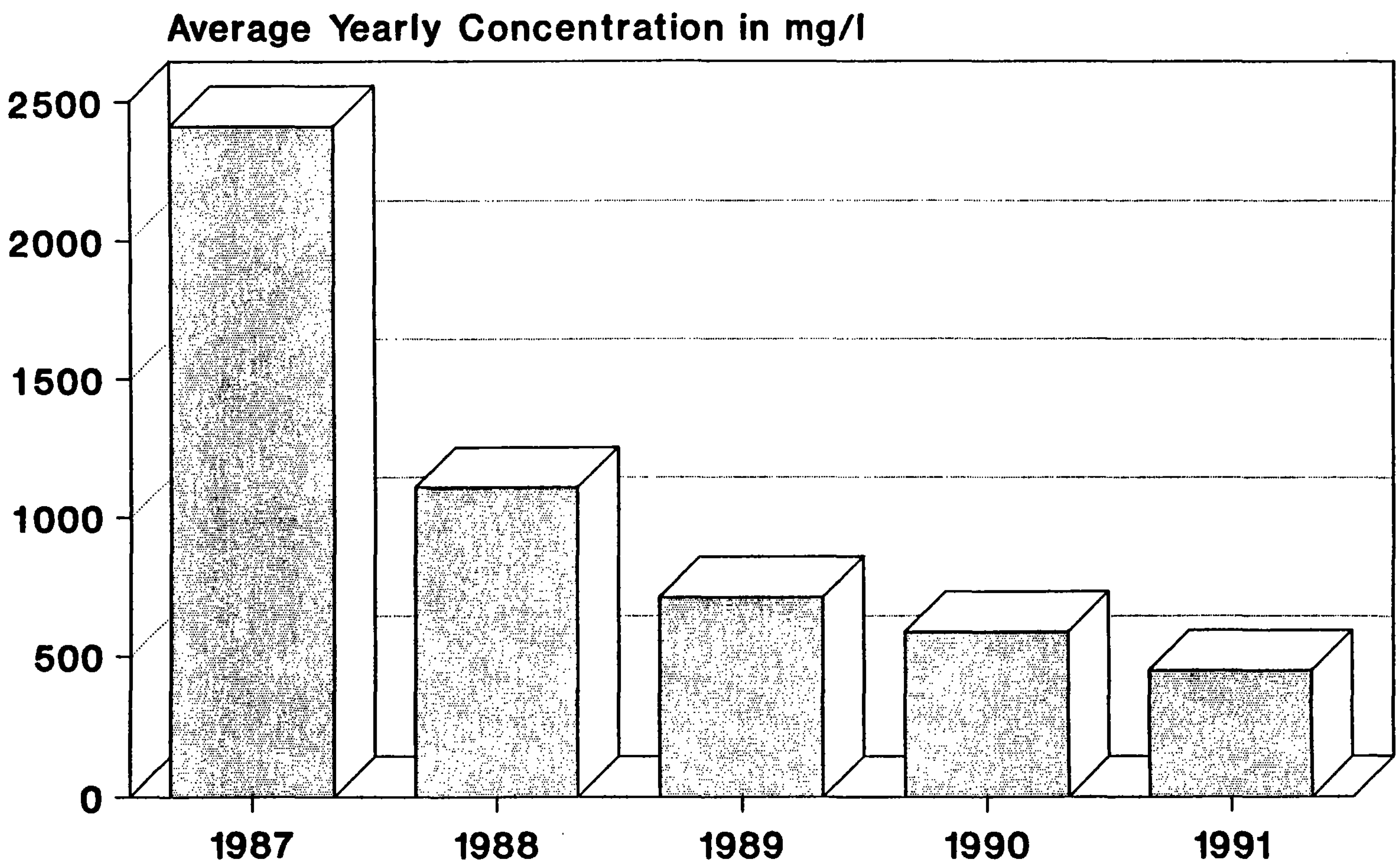
Figure 17 is a bar chart which shows the total mass of PDC discharged at Outfall 003 during calendar years 1988 through 1991. During this time period, the annual mass of PDC discharged at Outfall 003 has decreased by 73%. This information is relevant because the sole mechanism for PDC contamination in Outfall 003 discharge is groundwater intrusion. Therefore this is indirect evidence that groundwater concentrations of PDC are being reduced over time.

Groundwater Contamination
North Works

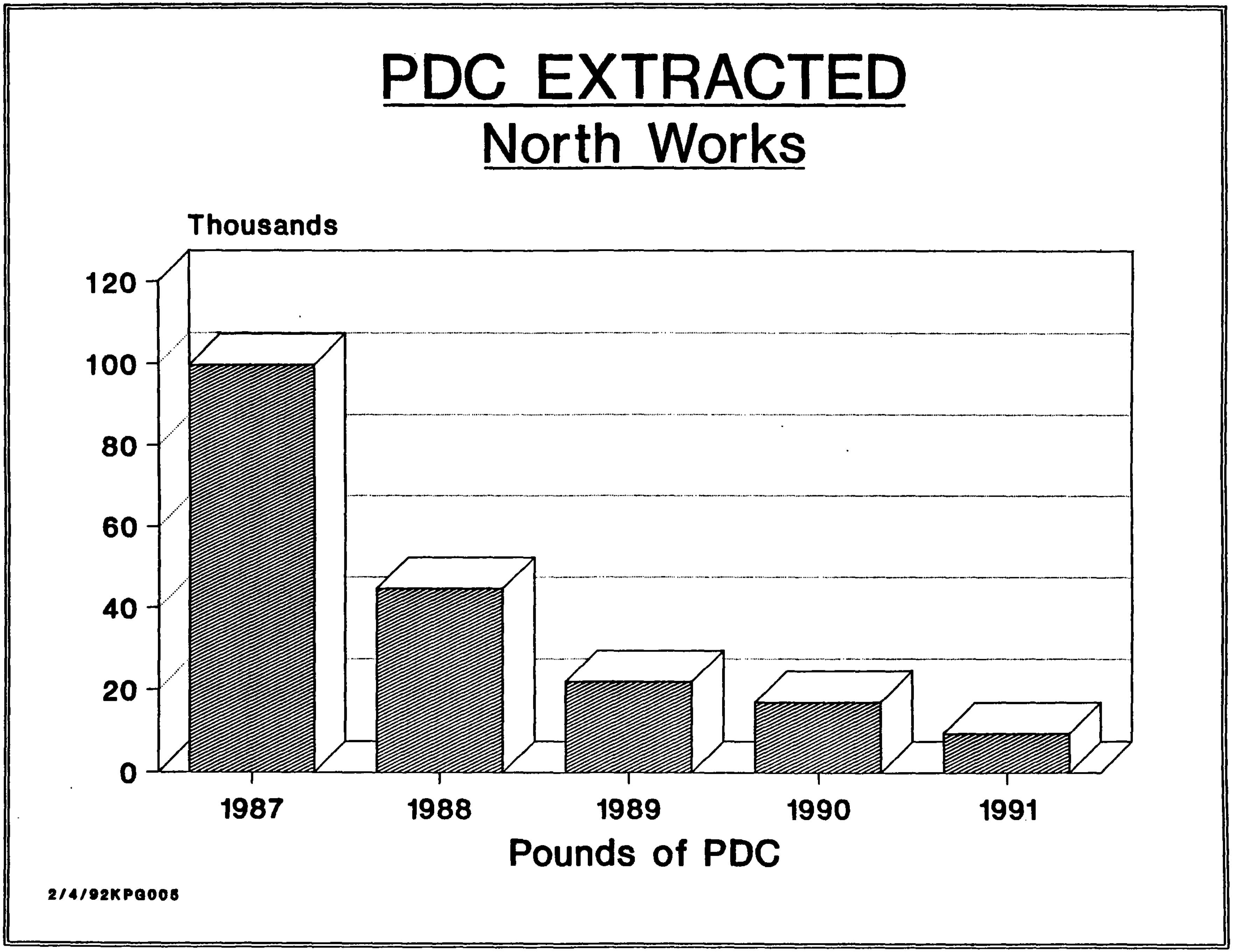


2/10/92KPG012

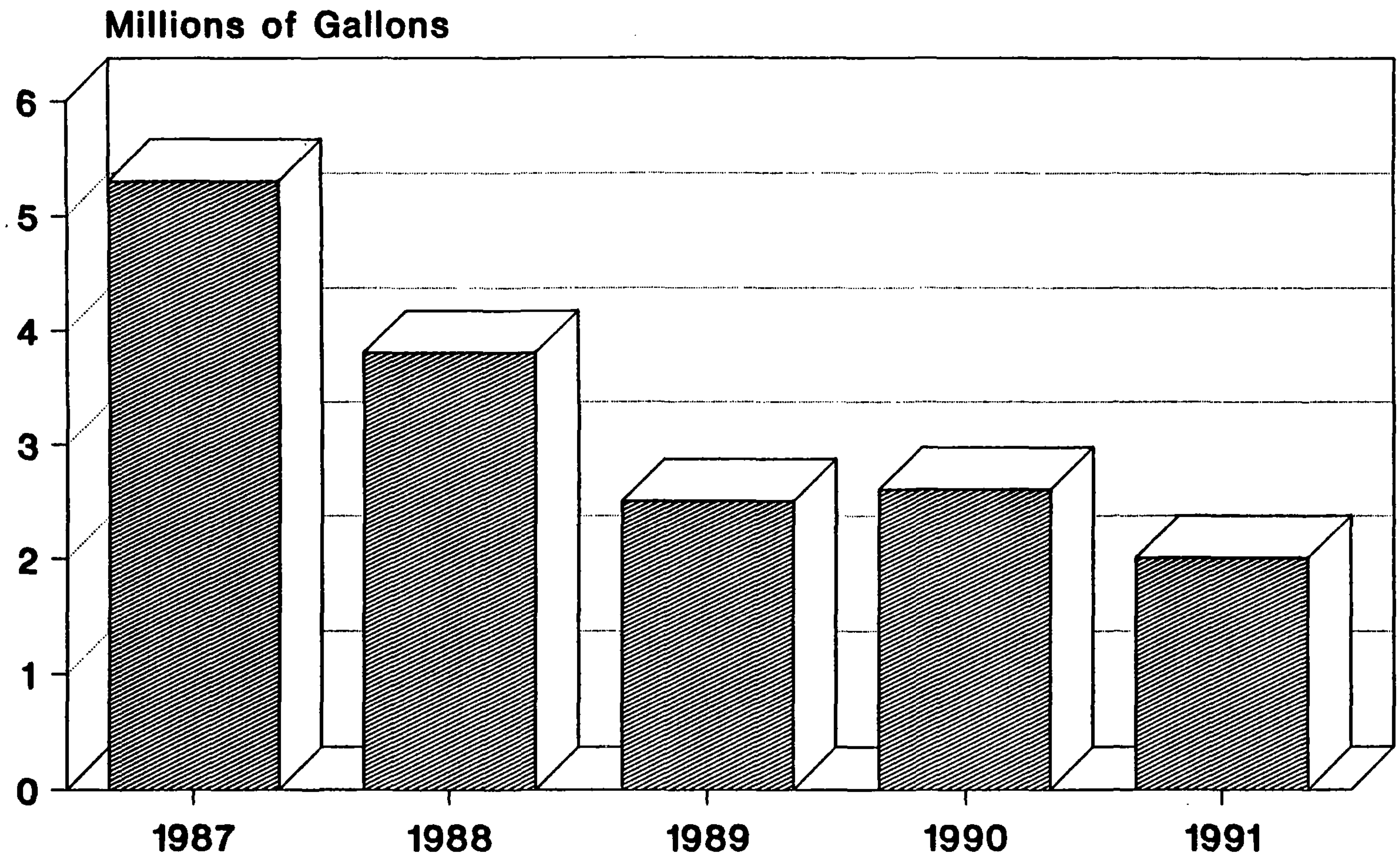
INFLUENT PDC CONCENTRATION
NORTH WORKS



2/4/92KPG010


PDC EXTRACTED
North Works
Thousands
120
100
80
60
40
20
0
1987
1988
1989
1990
1991
Pounds of PDC
2/4/92KPG005

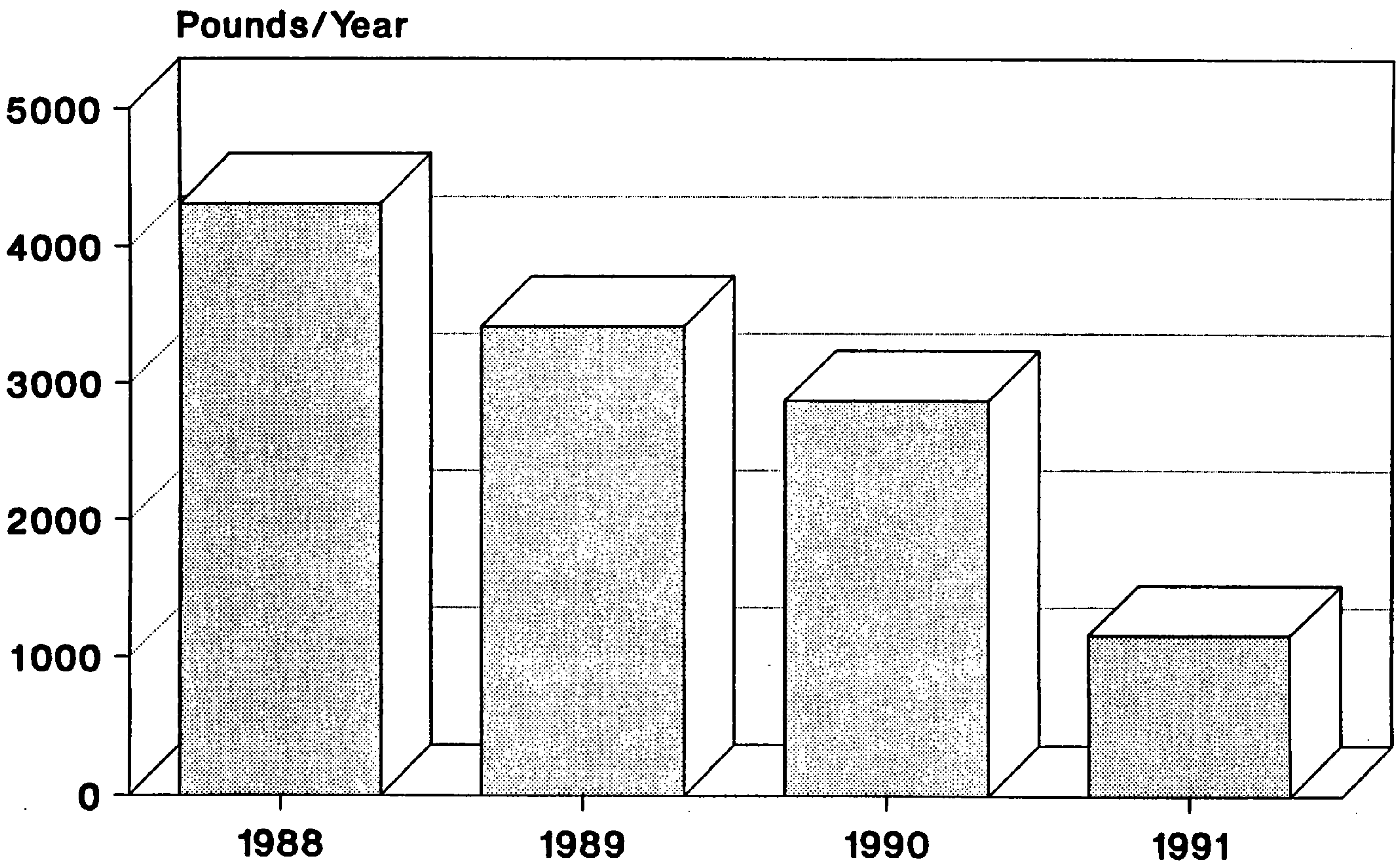
GROUNDWATER EXTRACTED
NORTH WORKS



2/4/92KPG009

Fi[illegible]e 17

OUTFALL 003
PDC DISCHARGED



2/4/92KPG033

APPENDIX F

EXHIBIT 14

current

AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

(i)

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
CHEMICAL ENGINEERING RESEARCH	C-5277	5-21563	04/06/89	050	PIX REACTOR VENTS (2)	TOTAL CONDENSORS		0.001 LBS/HR NOR 1.6 LBS/YR PIX 0.025 LBS/HR NOR
				"				32 LBS/YR N-METHYLPIPERIDINE 6.25 LBS/HR NOR 4.0 TONS/YR VOC (METHYL CHLORIDE) *
CHEMICAL ENGINEERING RESEARCH	PERMIT CAN-CELLED VIA 1991 MAPR	5-21561	04/06/89	051	DEV CHEM VENTS (2)	TOTAL CONDENSORS		NOT SPECIFIED
CHEMICAL ENGINEERING RESEARCH	C-8877	C-8877	12/05/91	052	EAST STEAM JETS (EJECTORS)	BAROMETRIC CONDENSERS		0.5 LBS/HR NOR 84 LBS/YR SOLVENT A (CONFIDENTIAL) **
CHEMICAL ENGINEERING RESEARCH	C-8873	C-8873	12/05/91	053	TANK TK-52	NONE		0.1 LBS/HR NOR 78 LBS/YR SOLVENT A (CONFIDENTIAL) **
CHEMICAL ENGINEERING RESEARCH	C-8876	C-8876	12/05/91	054	REACTOR R-30	NONE		1.6 LBS/HR NOR 0.53 TONS/YR SOLVENT A (CONFIDENTIAL) **
CHEMICAL ENGINEERING RESEARCH	C-8872	C-8872	12/05/91	055	MEASURE TANK T-28	NONE		
CHEMICAL ENGINEERING RESEARCH	C-8875	C-8875	12/05/91	056	REACTOR R-17	NONE		
CHEMICAL ENGINEERING RESEARCH	C-8878	C-8878	12/05/91	057	DRUMMING HOOD	NONE		1.0 LBS/HR NOR 93 LBS/YR SOLVENT A (CONFIDENTIAL) 0.00076 LBS/HR NOR
				"				0.015 LBS/YR NVP 0.36 LBS/HR NOR 3.6 LBS/YR CYCLOHEXYLAMINE **
CHEMICAL ENGINEERING RESEARCH	C-8874	C-8874	12/05/91	058	SCALE TANK T-63	NONE		0.7 LBS/HR NOR 0.29 TONS/YR SOLVENT A (CONFIDENTIAL) 0.24 LBS/HR NOR 139 LBS/YR
				"				SOLVENT B (CONFIDENTIAL) 1 LB/HR NOR 9.6 LBS/YR CYCLOHEXYLAMINE **

* FROM AIR PERMIT SUMMARY BY WAYNE COUNTY AIR POLLUTION CONTROL DIVISION.
** FROM 07/17/91 PERMIT CONDITIONS LETTER BY WAYNE COUNTY AIR POLLUTION CONTROL DIVISION.

04/08/94

curre[nt] air [perm]it info.

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PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
CHEMICAL ENGINEERING RESEARCH	C-9028 PERMIT CANCELED NOT INSTALLED		08/06/91	500	NaMBT REACTOR	FABRIC FILTER	2,000 GAL	0.02 LBS/HR NOR 1.2 LBS/YR 2-MBT *
CHEMICAL ENGINEERING RESEARCH	C-9699 ISSUED 04/06/93 CHLOR AMINE HCL			501 504 505	REACTOR R-1 VIA MECH VENT SYS REACTOR R-2 DRYER Z-1 VIA MECH VENT SYS	NONE SCRUBBER T-5 SCRUBBER T-9	300 GAL 300 GAL 4 CUBIC FEET	49.4 LBS/BATCH NOR 3.71 TON/YR TOT VOC'S -- 3.84 LB/BATCH NOR 0.29 TON/YR TOT HCl & SO2 ***
CHEMICAL ENGINEERING RESEARCH	C-10110 ISSUED 04/06/93 AMINE OXIDE	C-10110	03/08/94	054 058 503 052 057	REACTOR R-30 SCALE TANK TK-63 HOLD TANK TK-64 EAST STEAM JETS DRUMMING HOOD EF-S	CONDENSER E-4 NONE NONE BAROMETRIC CONDENSER NONE	2,000 GAL 1,000 GAL 774 GAL 7,000 CFM	6.4 LBS/BATCH NOR 243.0 LBS/YR TOTAL VOC'S FROM ALL VENT SOURCES ***
CHEMICAL ENGINEERING RESEARCH	C-10109 ISSUED 04/06/93 ACID ESTER			054 054 057 052	REACTOR R-30 " DRUMMING HOOD EF-S EAST STEAM JETS	CONDENSER E-5 CONDNESER E-4 NONE BAROMETRIC CONDENSER	2,000 GAL 2,000 GAL 7,000 CFM	3.4 LBS/BATCH NOR 112.2 LBS/YR TOTAL VOC'S FROM ALL VENT SOURCES ***
CHEMICAL ENGINEERING RESEARCH	C-10034 ISSUED 01/04/93 MONO-N-ACYL AM			501 504	REACTOR R-2 VIA MECH VENT SYS REACTOR R-2	NONE CONDENSER E-2	300 GAL 300 GAL	0.15 LB/HR NOR 6.1 LB/YR VOC (CHARGING)--0.05 LB/HR NOR 4.01 LB/YR VOC (REACTION) ****
CHEMICAL ENGINEERING RESEARCH	PENDING PENDING PENDING PENDING PENDING PENDING PENDING PENDING PENDING			502 503 506 507 508 509 510 511 512	TANK TK-65 HOLD TANK TK-64 REACTOR R-62 TANK TK-67 WEST STEAM JETS CONDENSER E-4 CONDENSER E-5 CONDENSER E-6 TANK TK-61	NONE NONE NONE NONE BAROMETRIC CONDENSERS NONE NONE NONE NONE	105 GAL 774 GAL 2000 GAL 376 GAL 90 MMHG ABS 322 FT**2 62 FT**2 2500 GAL	EACH PIECE OF EQUIPMENT IS INDIVIDUALLY PERMITTED--THE LIMITS ARE DEPENDENT UPON THE PROCESS FOR WHICH IT IS USED
CHEMICAL ENGINEERING RESEARCH	POLYOL A EXT. SUBMITTED 07/02/93							
CHEMICAL ENGINEERING RESEARCH	QUATERNARY AMMON SALT DF SUB 11/22/93			513	QUATERNAY AMMONIUM SALT DRY FLOWABLE PROCESS	DUST COLLECTOR, F-360A HEPA FILTER F360B	260 LBS/HR 6300 ACFM	0.17 PPM NOR 0.004 LBS/HR NOR 0.004 TONS/YR PARTICULATE NOR >10% OPACITY

04/08/94

* FROM 07/17/91 PERMIT CONDITIONS LETTER BY WAYNE COUNTY AIR POLLUTION CONTROL DIVISION.
** PERMIT NOT REQUIRED SINCE BOTH EMISSION RATES AND TOXICITY ARE VERY LOW, AS AGREED DURING VERBAL CONVERSATION WITH KWON ON 12/05/91. NOTE THAT ANY CHANGES TO THIS SYSTEM AFTER 12/05/91 MAY BE SUBJECT TO AIR PERMITTING.
*** FROM 03/22/93 PERMIT CONDITIONS LETTERS BY WAYNE COUNTY AIR POLLUTION CONTROL DIVISION
**** FROM 01/04/93 PERMIT CONDITIONS LETTER BY WAYNE COUNTY AIR POLLUTION CONTROL DIVISION

current

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
ELASTOCELL	C-7907	5-23008	04/10/89	300	SOLVENT STORAGE TANK (TK-111) BREATHER VENT	VAPOR RETURNS	3,000 GAL	0.78 LBS/YEAR OF VOC EMISSIONS *
ELASTOCELL	C-7908	5-23009	04/10/89	301	SOLVENT STORAGE TANK (TK-112) BREATHER VENT	VAPOR RETURNS	3,000 GAL	0.78 LBS/YEAR OF VOC EMISSIONS *
ELASTOCELL	C-7909	5-23010	04/10/89	302	MOLD CLEANING UNIT	FABRIC FILTER DUST COLLECTOR	1,320 CFM	0.003 LBS/HOUR NOR 0.012 TONS/YEAR OF PARTICULATE *
ELASTOCELL	C-8206	5-23018	04/10/89	303	NITROGEN DEBURRING MACHINE	FABRIC FILTER DUST COLLECTOR	300 SCFM	0.003 LBS/HOUR NOR 0.012 TONS/YEAR OF PARTICULATE *
ELASTOCELL	C-7910	5-23011	04/10/89	304	REACTOR (R-210)	CENTRIFUGAL SEPARATOR		NOT SPECIFIED
ELASTOCELL	C-7911	5-23012	04/10/89	305	REACTOR (R-220)	CENTRIFUGAL SEPARATOR		NOT SPECIFIED
ELASTOCELL	C-7912	5-23013	04/10/89	306	REACTOR (R-230)	CENTRIFUGAL SEPARATOR		NOT SPECIFIED
ELASTOCELL	C-7913	5-23014	04/10/89	307	VACUUM PUMPS	NONE		0.042 TONS/YEAR OF VOC EMISSIONS *
ELASTOCELL	C-7914	5-23015	04/10/89	308	NDI HOPPER	NONE		NOT SPECIFIED
ELASTOCELL	C-7915	5-23016	04/10/89	309	MOLD LINE EXHAUSTS (4)	NONE		NOT SPECIFIED
ELASTOCELL	C-7916 C-9073	5-23017 C-9073	04/29/91 11/14/91	310	OVENS AND GENERAL BUILDING EXHAUST	OIL MIST COLLECTOR	2,000 CFM	0.02 LB/HR NOR 170 LB/YR TOTAL SUSPENDED AND CONDENSIBLE PARTICULATES (WHITE OIL) **
ELASTOCELL	C-7906	5-23007	04/10/89	311	CROSS-LINKING WORK STATION EXHAUST	NONE	1,500 CFM	NOT SPECIFIED

* FROM 10/07/88 WAYNE COUNTY HEALTH DEPARTMENT AIR POLLUTION CONTROL DIVISION LETTER.
** FROM 04/29/91 WAYNE COUNTY HEALTH DEPARTMENT AIR POLLUTION CONTROL DIVISION LETTER.

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

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PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
ELASTOCELL	C-7905	5-23006	04/10/89	312	SOLVENT CLEANING STATION EXHAUST	NONE	4,000 CFM	NOT SPECIFIED
ELASTOCELL	MDI PROCESS SUBMITTED 03/04/94							

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
EPC	C-8110 ISSUED 02/15/90	5-23273	04/04/90	350	PNEUMATIC CONVEYOR SYSTEM RM1A SOURCE I.D. X-223 A	DUST COLLECTOR WITH FABRIC FILTER F-201-A	400 CFM	0.007 LBS/HR NOR 7.3 LBS/YR PARTICULATE *
EPC	C-8111 ISSUED 02/15/90	5-23276	04/04/90	351	PNEUMATIC CONVEYOR SYSTEM RM2 SOURCE I.D. X-323	DUST COLLECTOR WITH FABRIC FILTER F-301	409 CFM	0.007 LBS/HR NOR 7.3 LBS/YR PARTICULATE *
EPC	C-8112 ISSUED 02/15/90	5-23274	04/04/90	352	PNEUMATIC CONVEYOR SYSTEM FG1 SOURCE I.D. X-224	DUST COLLECTOR WITH FABRIC FILTER F-204	146 CFM	0.0013 LBS/HR NOR 8.1 LBS/YR PARTICULATE *
EPC	C-8113 ISSUED 02/15/90	5-23278	04/04/90	353	PNEUMATIC CONVEYOR SYSTEM FG2 SOURCE I.D. X-324	DUST COLLECTOR WITH FABRIC FILTER F-304	146 CFM	0.0013 LBS/HR NOR 8.1 LBS/YR PARTICULATE *
EPC	C-8114 ISSUED 02/15/90	5-23275	04/04/90	354	FLUID BED COOLER 1 SOURCE I.D. E-202	DUST COLLECTOR WITH FABRIC FILTER F-203	1,000 CFM	0.0044 LBS/HR NOR 27.5 LBS/YR PARTICULATE *
EPC	C-8108 ISSUED 02/15/90	5-23279	04/04/90	355	FLUID BED COOLER 2 SOURCE I.D. E-302	DUST COLLECTOR WITH FABRIC FILTER F-303	1,000 CFM	0.0044 LBS/HR NOR 27.5 LBS/YR PARTICULATE *
EPC	C-8106 ISSUED 02/15/90	5-23277	04/04/90	356	MIXER, HOPPER AND SCALE DUST COLLECTION SYSTEMS	DUST COLLECTOR WITH FABRIC FILTER F-305	300 CFM	0.0009 LBS/HR NOR 5.6 LBS/YR PARTICULATE *
EPC	C-8105 ISSUED 02/15/90	5-23280	04/04/90	357	BAG DISCHARGE SYSTEM SOURCE I.D. X-310	X-310	672 CFM	0.01 LBS/HR NOR 24 LBS/YR PARTICULATE *
EPC	C-8104 ISSUED 02/15/90	5-23281	04/04/90	358	GENERAL PLANT PROCESS VENTS - SOURCE I.D. T-10	VENTURI WASHER	4,150 CFM	0.005 GR/DSCF NOR 0.0176 LBS/HR NOR 109.8 LBS/YR PARTICULATE *
EPC	C-8654 ISSUED 02/15/90	5-23282	04/04/90	359	PNEUMATIC CONVEYOR SYSTEM RM1B SOURCE I.D. X-223 B	DUST COLLECTOR WITH FABRIC FILTER F-201-B	400 CFM	0.007 LBS/HR NOR 7.3 LBS/YR PARTICULATE *
EPC	C-9407 CANCELLED NOT INSTALLED		01/17/92	360	SCRAP PLASTIC GRINDER	CYCLONE COLLECTOR	700 ACFM	0.02 LBS/HR NOR 0.02 TONS/YR PARTICULATE **
EPC	05/21/92	EXEMPT		361	PNEUMATIC CONVEYOR SYSTEM BL01	FABRIC FILTER WITH VENTURI WASHER	150 CFM	***

04/08/94

* FROM 01/22/90 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
** FROM 12/10/91 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
***EXEMPT FROM PERMITTING AS PER 05/21/92 WCAPCD LETTER

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

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PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
EPC	EXEMPT*			362	RAILCAR UNLOADING - NYLON	FABRIC FILTER F-1011Z	25,200 LB/HR NYLON 1,450 SCFM	
EPC	EXEMPT*			363	RAILCAR UNLOADING - PBT	FABRIC FILTER F-1021Z	25,200 LB/HR PBT 1,450 SCFM	
EPC	EXEMPT*			364	NYLON "A" SILO	FABRIC FILTER F-1040	7,000 CU FT 1,450 SCFM	
EPC	EXEMPT*			365	NYLON "B" SILO	FABRIC FILTER F-1050	7,000 CU FT 1,450 SCFM	
EPC	EXEMPT*			366	PBT SILO	FABRIC FILTER F-1060	7,000 CU FT 1,450 SCFM	
EPC	EXEMPT*			367	LINE 4 PELLET FEED MIXER	FABRIC FILTER F-427	100 GAL 375 SCFM	
EPC	EXEMPT*			368	LINE 5 PELLET FEED MIXER	FABRIC FILTER F-527	100 GAL 375 SCFM	
EPC	EXEMPT*			369	LINE 6 PELLET FEED MIXER	FABRIC FILTER F-627	100 GAL 375 SCFM	
EPC	EXEMPT*			370	ELASTOMER FEED H-405	FABRIC FILTER F-426	150 GAL 225 SCFM	
EPC	EXEMPT*			371	MIXER/GLASS HANDLING VENT	FABRIC FILTER F-425	1160 SCFM	
EPC	EXEMPT*			372	LINE 4 MINERAL FILLER HOOD	FABRIC FILTER X-406	1,100 LB/HR 350 SCFM	
EPC	EXEMPT*			373	PELLET COOLER LINE 4, Z-421	FABRIC FILTER F-421	2,200 LB/HR 3,000 SCFM	

* PLANT EXEMPTED FROM AIR PERMIT REQUIREMENTS (MDNR, AQD RULE 286(A)) DECEMBER 21, 1993 WCAPCD LETTER.

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
EPC	EXEMPT*			374	LINE 4 PRODUCT PACKOUT	FABRIC FILTER F-424	20 SCFM	
EPC	EXEMPT*			375	LINE 5 PRODUCT PACKOUT	FABRIC FILTER F-524	20 SCFM	
EPC	EXEMPT*			376	LINE 6 MINERAL FILLER HOOD	FABRIC FILTER X-606	1,100 LB/HR 350 SCFM	
EPC	EXEMPT*			377	LINE 6 PRODUCT PACKOUT	FABRIC FILTER F-624	20 SCFM	
EPC	EXEMPT*			378	EXTRUDER VENT, LINES 4-6	VENTURI SCRUBBER	7500 SCFM	
EPC	EXEMPT*			379	PELLET COOLER LINE 5, Z-521	FABRIC FILTER F-522	4015 SCFM	
EPC	EXEMPT*			380	PELLET COOLER LINE 6, Z-621	FABRIC FILTER F-622	4015 SCFM	

* PLANT EXEMPTED FROM PERMIT REQUIREMENTS (MDNR, AQD RULE 286(A)), DECEMBER 21, 1993 WCAPCD LETTER.

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

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PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
EPP		***		125	TCP STORAGE TANK (TK-701)	NONE		
EPP		***		126	PP MINI PELLET SEPARATOR/ TRANSFER BLOWER (CY-706/BL-704)	NONE		
EPP		***		127	PP WEIGH HOPPER (H-710)	NONE		
EPP		***		128	BUTANE STORAGE TANK (TK-700)	NONE		
EPP		***		129	PROCESS WATER TANK (TK-760)	NONE		
EPP		***		130	ARMOSTAT STORAGE TANK (TK-730)	NONE		
EPP		***		131	IMPREGATION VESSEL (D-710)	NONE		
EPP		***		132	GAS HOLDER (TK-780)	NONE		
EPP	C-8107 ISSUED 11/89	5-23254	03/14/90	136	PRODUCT SILOS (X-740 A-D)	DUST COLLECTOR (F-780)		.044 LBS/HR NOR .19 TONS/YR OF PARTICULATE *
EPP	C-8109 ISSUED 11/89	5-23255	03/14/90	137	PACKAGING SILOS (X-741 A-B)	DUST COLLECTOR (F-741)		.044 LBS/HR NOR .19 TONS/YR OF PARTICULATE *
EPP		***		138	RECYCLE WATER TANK (TK-782)	NONE		
EPP		***		139	NEUTRALIZATION TANK (TK-781)	NONE		

* FROM 11/01/89 AIR POLLUTION CONTROL LETTER.
*** PERMIT NOT REQUIRED AS PER 12/4/89 TELEPHONE CONVERSATION WITH P. KURIKESU OF THE WAYNE COUNTY AIR POLLUTION CONTROL DIVISION

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
EPP		***		140	MOLDING MACHINE (2) (Z-770/Z-771)	NONE		
EPP		N/A			FUGITIVE EMISSIONS			5.28 LBS/HR NOR 23.13 TONS/YR OF VOC *
EPP	EXEMPT (NOTE 1)	****		145	TCP FLEXIBLE CONVEYOR	DUST COLLECTOR (F-841)		
EPP	C-8904 (NOTE 1)	C-8904	12/23/92	146	NITRIC ACID STORAGE TANK (TK-702)	SCRUBBER (T-702)		6 LBS/YR OF NITRIC ACID
EPP	EXEMPT (NOTE 2)				BULK STORAGE/LOADING FACILITY			
EPP (EXPANSION)	APPLICATION SUBMITTED 06/04/93			133	PP MINI PELLET SEPARATOR (CY-806)	DUST COLLECTOR (F-804)		
EPP (EXPANSION)	EXEMPT (N2 EMISSIONS ONLY)			134	PP MINI PELLET WEIGH HOPPER (H-810)			
EPP (EXPANSION)	EXEMPT (N2 EMISSIONS ONLY)			135	IMPREGNATION VESSEL D-810			
EPP (EXPANSION)	APPLICATION SUBMITTED 06/04/93			141	FLASH DRYER (DR-880)	NONE		
EPP (EXPANSION)	EXEMPT (NO EXTERNAL VENT)			142	SPIN DRYER (CF-831)	DUST COLLECTOR (F-880)		
EPP (EXPANSION)	APPLICATION SUBMITTED 06/04/93			143	BATCH SILOS (X-840)	DUST COLLECTOR (F-880)		
EPP (EXISTING)	APPLICATION SUBMITTED 06/04/93			144	PELLET CLASSIFIER (SC-740)	SEPARATOR/ DUST COLLECTOR (S-741)		

* FROM 11/01/89 AIR POLLUTION CONTROL LETTER.
*** PERMIT NOT REQUIRED AS PER 12/04/89 TELEPHONE CONVERSATION WITH P. KURIKESU OF THE WAYNE COUNTY AIR POLLUTION CONTROL DIVISION
**** PERMIT NOT REQUIRED AS PER 8/12/92 LETTER FROM LILLIAN WOOLLEY OF THE WAYNE COUNTY AIR POLLUTION CONTROL DIVISION
NOTE 1: NEW PERMITS SUBMITTED W/ EXPANSION PACKAGE DUE TO INCREASE OF RAW MATERIAL THRUPUT.
NOTE 2: PERMITS NOT REQUIRED PER MDNR AQD RULE 284-PLASTICS MATERIAL PROCESSING.

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
EPP (EXPANSION)	APPLICATION SUBMITTED 06/04/93			147	PELLET CLASSIFIER (SC-840)	SEPARATOR/ DUST COLLECTOR (S-841)		
EPP (EXPANSION)	APPLICATION SUBMITTED 06/04/93			148	RUN-DOWN VESSEL (D-820)			

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
POLYMERS	MODIFIED 01/08/91	5-21551	04/06/89	016	POLYOL VACUUM JETS (6)	SCRUBBER WITH WATER		NONE SPECIFIED
POLYMERS	C-2123	5-21550	04/06/89	017	POLYOL TDA SCRUBBER	SCRUBBER WITH WATER	50 CFM	NONE SPECIFIED
POLYMERS	C-6023	5-21552	04/06/89	080	POLYOL FUME INCINERATOR	INCINERATOR	26 LBS/HOUR	0.01 UG/M3 ACRYLONITRILE 6.48 LB/HR NOR 4.2 TONS/YR NO2 *
POLYMERS	C-5637	5-22984	04/06/89	018	MAGNESIUM SILICATE CHARGING HOOD	DUST COLLECTOR	850 CFM	NONE SPECIFIED
POLYMERS	C-8618	C-8618	02/13/92	019	TDI STORAGE TANK	CARBON ADSORBER		0.00058 LBS/HR NOR 0.155 LBS/YR TDI **
				"				
POLYMERS	****	***		104	SULFURIC ACID STORAGE TANK	NONE		
POLYMERS	***				PHOSPHORIC ACID STORAGE TANK TK-4338	NONE	6,200 GALLONS	

* FROM WAYNE COUNTY AIR POLLUTION CONTROL DIVISION'S AIR PERMIT SUMMARY.
** FROM 12/05/89 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
*** PERMIT NOT REQUIRED AS PER 10/21/91 PHONE CONVERSATION WITH JAI SINGH OF WCAPCD.
**** PERMIT NOT REQUIRED FOR STORAGE OF ACID (NON-VOLATILE AND LOW TOXICITY).

03/14/92

current

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
STEAM FACILITY	C-5639	5-21557	04/06/89	060	BOILER- 0018 STEAM GENERATORS #1	NONE	49.90 MBTU/HOUR	4.5 LBS/HOUR NOR 16.0 TONS/YEAR OF PARTICULATE DURING OIL USAGE *
STEAM FACILITY	C-5640	5-21558	04/06/89	060	BOILER- 0018 STEAM GENERATORS #2	NONE	49.90 MBTU/HOUR	4.5 LBS/HOUR NOR 16.6 TONS/YEAR OF PARTICULATE DURING OIL USAGE *
STEAM FACILITY	C-5641	5-21559	04/06/89	060	BOILER- 0018 STEAM GENERATORS #3	NONE	49.90 MBTU/HOUR	4.5 LBS/HOUR NOR 16.6 TONS/YEAR OF PARTICULATE DURING OIL USAGE *
STEAM FACILITY	C-5642	5-22995	04/06/89	060	BOILER- 0018 STEAM GENERATORS #4	NONE	49.90 MBTU/HOUR	4.5 LBS/HOUR NOR 16.6 TONS/YEAR OF PARTICULATE DURING OIL USAGE *

03/12/92

* BASED ON LIMITATIONS SET FORTH IN WAYNE COUNTY HEALTH DEPARTMENT AIR POLLUTION CONTROL DIVISION LETTERS DATED 11/20/87 AND 10/07/88.

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
TPU EXTRUDER	C-8233 ISSUED 10/24/89	C-8233	02/09/90	155	THERMOPLASTIC POLYURETHANE EXTRUDERS	NONE	1,800 SCFM	0.0052 LB/HR NOR 0.023 TON/YR TONS/YR OF DIPPI *
TPU SYNTHESIS	C-8931 ISSUED 06/26/90	C-8931	02/09/94	160 (VS 01)	MDI STORAGE TANKS (2)	CARBON BED	8,700 GAL	2.7 UG/SEC NOR 0.003 LB/YR OF MDI **
TPU SYNTHESIS	C-8932 ISSUED 06/26/90	C-8932	02/09/94	161 (VS 02)	LUPRAGEN STORAGE TANK	CARBON BED	270 GAL	0.9 UG/SEC NOR 0.0011 LB/YR OF LUPRAGEN 1.2 UG/SEC NOR 0.0015 LB/YR OF DIPPI **
TPU SYNTHESIS	C-8933 ISSUED 06/26/90	C-8933	02/09/94	162 (VS 03)	LUPRAGEN OVEN	NONE	6,250 CFM	10.5 UG/SEC NOR 0.006 LB/YR OF LUPRAGEN 1.8 UG/SEC NOR 0.001 LB/YR OF DIPPI **
TPU SYNTHESIS	C-8934 ISSUED 06/26/90	C-8934	02/09/94	163 (VS 04)	POLYDIOL REFILL VESSELS (2)	NONE		
TPU SYNTHESIS	C-8935 ISSUED 06/26/90	C-8935	02/09/94	164 (VS 05)	MDI REFILL VESSEL	CARBON BED		9.6 UG/SEC NOR 0.01 LB/YR OF MDI **
TPU SYNTHESIS	C-8936 ISSUED 06/26/90	C-8936	02/09/94	165 (VS 06)	BUTANEDIOL REFILL VESSEL	NONE		
TPU SYNTHESIS	C-8937 ISSUED 06/26/90	C-8937	02/09/94	166 (VS 07)	LUPRAGEN DOSING VESSEL	CARBON BED		5.9 UG/SEC NOR 0.0024 LB/YR OF LUPRAGEN 0.8 UG/SEC NOR 0.0003 LB/YR OF DIPPI **

04/08/94

* FROM 08/30/89 WAYNE COUNTY HEALTH DEPARTMENT AIR POLLUTION CONTROL DIVISION LETTER.
** FROM 03/23/93 WAYNE COUNTY HEALTH DEPARTMENT AIR POLLUTION CONTROL DIVISION LETTER (REVISION OF 06/04/90 LETTER).

current

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
TPU SYNTHESIS	C-8938 ISSUED 06/26/90	C-8938	02/09/94	167 (VS 08)	REACTION BELT HOT ZONE	WATER SCRUBBER	588 CFM	0.0017 G/SEC NOR 115 LB/YR OF DIPPI 0.00037 G/SEC NOR 26 LB/YR OF MDI 0.0019 G/SEC NOR 134 LB/YR OF LUPRAGEN 0.03 G/SEC NOR 0.097 TONS/YR OF 1,4-BUTANEDIOL *
TPU SYNTHESIS	C-8939 ISSUED 06/26/90	C-8939	02/09/94	168 (VS 09, 10 & 11)	REACTION BELT COOL ZONE	NONE	11,500 CFM	0.33 G/SEC NOR 11.6 TON/YR OF 1,4-BUTANEDIOL 0.0091 G/SEC NOR 632.2 LB/YR OF LUPRAGEN 0.0068 G/SEC NOR 471 LB/YR OF DIPPI 0.0018 G/SEC NOR 130 LB/YR OF MDI *
TPU SYNTHESIS	C-8940 ISSUED 06/26/90	C-8940	02/09/94	169 (VS 12)	MIX POT AREA/ MAIN MIXING HEAD	NONE	706 CFM	None Specified
TPU SYNTHESIS	C-8930 ISSUED 06/26/90	C-8930	02/09/94	170 (VS 25)	POLYDIOL STORAGE TANKS (2)	NONE	26,400 GAL	None Specified
TPU SYNTHESIS	C-8929 ISSUED 06/26/90	C-8929	02/09/94	171 (VS 26)	BUTANIEDIOL STORAGE TANK	NONE	8,700 GAL	None Specified
TPU SYNTHESIS	C-8941 ISSUED 06/26/90	C-8941	02/09/94	172 (VS 15)	MIX POT CLEANING OPERATION OVEN	WATER SCRUBBER	371 CFM	None Specified
TPU SYNTHESIS	C-8942 ISSUED 06/26/90	C-8942	02/09/94	173 (VS 16 VIA VS 17)	SILOS (3)	DUST COLLECTOR	70 CFM	0.0004 G/SEC NOR 26 LB/YR OF PARTICULATES 0.00021 G/SEC NOR 14.4 LB/YR OF DIPPI *

04/08/94

* FROM 03/23/93 WAYNE COUNTY HEALTH DEPARTMENT AIR POLLUTION CONTROL DIVISION LETTER (REVISION OF 06/04/90 LETTER).

current

AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	ALLOWABLE EMISSIONS NOT TO EXCEED
TPU SYNTHESIS	C-8943 ISSUED 06/26/90	C-8943	02/09/94	174 (VS 17)	DOUBLE CONE BLENDERS (2)	DUST COLLECTOR	1,471 CFM	0.008 G/SEC NOR 0.29 TON/YR OF PARTICULATES 0.0000864 G/SEC NOR 0.3 LB/YR OF DIPPI *
TPU SYNTHESIS	C-8944 ISSUED 06/26/90	C-8944	02/09/94	175 (VS 18)	DICER	NONE	1,176 CFM	0.0015 G/SEC NOR 105 LB/YR OF DIPPI *
TPU SYNTHESIS	C-8945 ISSUED 06/26/90	C-8945	02/09/94	176 (VS 19)	DISCONTINUOUS DRYER	CARBON BED	147 CFM	0.00163 G/SEC NOR 4 LB/YR OF DIPPI *
TPU SYNTHESIS	C-8946 ISSUED 06/26/90	C-8946	02/09/94	177 (VS 13)	BELT AREA VENTILATION	NONE	10,500 CFM	None Specified
TPU SYNTHESIS	C-8947 ISSUED 06/26/90	C-8947	02/09/94	178 (VS 27)	TABLE VENTILATION	NONE	3,000 CFM	None Specified

04/08/94

* FROM 03/23/93 WAYNE COUNTY HEALTH DEPARTMENT AIR POLLUTION CONTROL DIVISION LETTER (REVISION OF 06/04/90 LETTER).

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AIR PERMIT
INFORMATION

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BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	EMISSIONS NOT TO EXCEED
VITAMIN E	C-5315 04/08/80	5-21554	04/06/89	042	TMHQ HOPPER	FABRIC FILTER COLLECTOR	3200 ACFM	1.46 LBS/HR NOR 5.25 TONS/YR OF PARTICULATES *
VITAMIN E	C-4559-62 11/19/78	5-21560	04/06/89	040	(4) UNITS VACUUM PUMPS (PHARMA DISTRIBUTIION)	NONE	9000 CU FT/HR	0.00 LBS/HR NOR 0.00 TONS/YR OF PARTICULATE *
VITAMIN E	C-4563 11/19/78	5-21555	04/06/89	044	SILICA AIRVEYING SYSTEM - VITAMIN E ***	SETTLING CHAMBER FABRIC FILTER COLLECTOR	1200 ACFM	0.10 LBS/1000 LBS OF EXHAUST NOR 2.4 TONS/YR OF PARTICULATE *
VITAMIN E	C-4564 11/19/78	5-22981	04/06/89	045	SILICA SILO	FABRIC FILTER COLLECTOR	700 ACFM	0.10 LBS/1000 LBS OF EXHAUST NOR 1.4 TONS/YR OF PARTICULATE *
VITAMIN E	C-4558 11/19/78	5-21548	04/06/89	041	SLURRY TANK - VITAMIN E R-100	NONE		0.00 LBS/HR NOR 0.00 TONS/YR OF PARTICULATE *
VITAMIN E	C-4565 11/19/78	5-21556	04/06/89	043	E50% BAGGING OPERATION FILTER ***	FABRIC FILTER COLLECTOR	500 ACFM	0.10 LBS/1000 LBS OF EXHAUST NOR 0.99 TONS/YR OF PARTICULATE *
VITAMIN POWDERS	C-5525 C-5526 09/11/80	5-21543	04/06/89	070	VITAMIN A SPRAY TOWER ***	SINGLE CYCLONE FABRIC FILTER COLLECTOR	2500 SCFM	0.10 LBS/1000 LBS OF EXHAUST NOR 2.4 TONS/YR OF PARTICULATE *
VITAMIN POWDERS	C-5527-31 C-5538 09/11/80	500418 - 21	09/18/85	071	VITAMIN A FLUID BED DRYER (3 UNITS)	SINGLE CYCLONE FABRIC FILTER COLLECTOR		0.10 LBS/1000 LBS OF EXHAUST NOR 2.5 TONS/YR OF PARTICULATE *
VITAMIN POWDERS	C-5532 C-5533 09/11/80	500422	09/18/85	072	VITAMIN A PRODUCT TRANSFER BLOWER ***			0.10 LBS/1000 LBS OF EXHAUST NOR 0.14 TONS/YR OF PARTICULATE *
VITAMIN POWDERS	C-5534 C-5535 09/11/80	5-21540	04/06/89	073	VITAMIN A SPOT VENTILATION SYSTEM VITAMIN A STORAGE SILO	FABRIC FILTER COLLECTOR	1760 SCFM	0.10 LBS/1000 LBS OF EXHAUST NOR 1.41 TONS/YR OF PARTICULATE *
VITAMIN POWDERS	C-5536 C-5537 09/11/80	5-21539	04/06/89	074	VITAMIN A STARCH COLLECTION BLOWER ***	SINGLE CYCLONE FABRIC FILTER COLLECTOR		0.10 LBS/1000 LBS OF EXHAUST NOR 0.48 TONS/YR OF PARTICULATE *
VITAMIN POWDERS	C-6746 09/11/80	5-22982	04/06/89	075	AIR HEATER FOR SPRAY DRYER ***	NONE	1.5 MILLION BTU/HR USING NATURAL GAS	0.00 LBS/HR NOR 0.00 TONS/YR OF PARTICULATE **

* FROM 10/07/88 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
*** VENT DESCRIPTION REVISED IN 06/07/90 CERTIFICATE OF OPERATION.

02/11/94

current

AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

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PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	EMISSIONS NOT TO EXCEED
VITAMIN POWDERS	C-9167 07/11/91	C-9167	01/30/92	076	SPRAY DRYER, DY801	BAG FILTER, F805 CYCLONE, CY801	3,000 CFM	0.01 LBS/1000 LBS OF EXHAUST NOR 0.14 LB/HR NOR 0.43 TONS/YR OF PARTICULATE ***
VITAMIN POWDERS		*****		077	DOUBLE CONE DRYER (CHANGE TO SCRUBBER EXHAUST)	SCRUBBER		
VITAMIN FOOD BLENDS		*		078	FOOD BLENDS LABELER	NONE		
VITAMIN POWDERS	C-9166 07/11/91	C-9166	01/30/92	079	SPOT DUST COLLECTION B803	FABRIC FILTER F803	1,600 CFM	0.01 LBS/1000 LBS OF EXHAUST NOR 0.092 LB/HR NOR 0.288 TONS/YR OF PARTICULATE ***
VITAMIN POWDERS	C-9168 07/11/91	C-9168	01/30/92	200	POWDER PLANT VACUUM CLEANING	FABRIC FILTER	500 CFM	0.01 LBS/1000 LBS OF EXHAUST NOR 0.0228 LB/HR NOR 0.071 TONS/YR OF PARTICULATE ***
VITAMIN POWDERS	C-9165 07/11/91	C-9165	01/30/92	201	SCREW BLENDER (BL-801 CHARGING SYSTEM)	FABRIC FILTER F805	400 CFM	0.01 LBS/1000 LBS OF EXHAUST NOR 0.018 LBS/HR NOR 0.025 TONS/YR OF PARTICULATE ***
VITAMIN E	C-9100 10/04/91	C-9100	11/14/91	047	NITROGEN PADDING SYSTEM	NONE	2.5 SCFM	1.4 LBS/HR NOR 33 LBS/DAY NOR 4.5 TONS/YR OF VOC ****
VITAMIN E	EXEMPT 12/22/93 WCAPCD LETTER			202	E50% RIBBON BLENDER, BL172	CARTRIDGE FILTER F177	785 LBS/HOUR 10 CFM	NONE
VITAMIN E	EXEMPT 12/22/93 WCAPCD LETTER			203	E50% VACUUM CONVEYOR, Z-172	INTEGRAL CARTRIDGE FILTER	145 SCFM	NONE
VITAMIN E	EXEMPT ** 06/16/93			204	$ZnCl_2$ WASTE STORAGE, TK-196	NONE		NONE

* AS PER 12/20/89 LETTER, EXEMPT FROM PERMITTING (SECTION 411(A)1 OF THE ORDINANCE).
** AS PER 06/16/93 PHONE CONVERSATION W/ A. SCHEANS, WCAPCD, EXEMPT FROM PERMITTING (MDNR AQD RULE 284 (H))
*** FROM 05/24/91 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
**** FROM 09/04/91 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
***** REMOVED FROM SERVICE AS PER 04/04/91 PHONE CONVERSATION WITH WAYNE COUNTY AIR POLLUTION CONTROL DIVISION.

02/11/94

APPENDIX F

EXHIBIT 15

All Equipment removed from source

no longer in use

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

	PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
41	WINDSHIELD ADHESIVES	C-7831	5-22550	10/18/88	081	9999 WATER PASTE MIX TANK (TK-127)	MIX TANK BAG HOUSE F-120	150 SQ.FT. CLOTH AREA/850 ACFM	0.0015 LBS/HR NOR 0.004 TONS/YR OF PARTICULATE *
42	WINDSHIELD ADHESIVES	C-7832	5-22551	10/18/88	082 ✓	9999 METHANOL SURGE TANK (TK-106)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		FILLING OF TK106 SHALL NOT EXCEED 0.007 LBS/HR NOR 0.002 TONS/YR OF VOC'S *
43	WINDSHIELD ADHESIVES	C-7833	5-22552	10/18/88	083	1083 LABORATORY PAINT SPRAY BOOTH (X-123)	PAINT ARRESTORS	2500 SCFM	0.02 LBS/100 LBS EXHAUST 0.076 LBS/HR NOR 0.019 TONS/YR OF PARTICULATE
					"				1.14 LBS/HR NOR 0.285 TONS/YR OF VOC'S *
44	WINDSHIELD ADHESIVES	C-7834	5-22553	10/18/88	084 ✓	9999 SILANE TOTE BIN (TK-153)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		FILLING OF SILANE TOTE BINS SHALL NOT EXCEED 0.00026 LBS/HR NOR
					"				0.0000156 TONS/YR *
45	WINDSHIELD ADHESIVES	C-7552	5-21881	08/19/88	090 ✓	9999 ADDITIVES MAKE-UP TANK (TK-103 AND TK-104)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		SEE NOTE ***
46	WINDSHIELD ADHESIVES	C-7553	5-21882	08/19/88	091	9999 PRIMER MIX TANK (TK-129)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		0.0028 GRAMS/SEC, 0.022 LBS/HR NOR 0.055 TONS/YR OF MEK, TRICHLOROETHANE, & TOLUENE **
47	WINDSHIELD ADHESIVES	C-7554	5-21883	08/19/88	092	9999 PRIMER HOLD TANK (TK-120)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		0.0028 GRAMS/SEC, 0.022 LBS/HR NOR 0.055 TONS/YR OF MEK, TRICHLOROETHANE, & TOLUENE **
48	WINDSHIELD ADHESIVES	C-7555	5-21884	08/19/88	093 ✓	9999 CARBON BLACK DRYER (E-113)	NONE		0.66 LBS/HR NOR 1.65 TONS/YR **
49	WINDSHIELD ADHESIVES	C-7556	5-21885	08/19/88	094 ✓	9999 DRY CARBON STORAGE BIN (TK-116)	NONE		0.06 LBS/HR NOR 0.15 TONS/YR **

03/12/92

* FROM 09/28/87 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
** FROM 09/02/87 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
*** NOTE: COMBINED EMISSIONS OF METHANOL FROM THE ADDITIVES FEED TANK (TK-104) AND THE ADDITIVES MAKE-UP TANK (TK-103) SHALL NOT EXCEED 0.00133 GRAMS/SECOND, 0/00198 LBS/HOUR, NOR 0.005 TONS/YEAR **

All equipment removed from service 4

AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

	PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
50	WINDSHIELD ADHESIVES	C-7557	5-21886	08/19/88	095	9999 WET CARBON BLACK BINS (TK-117 AND TK-118)	NONE		0.11 LBS/HR NOR 0.275 TONS/YR **
51	WINDSHIELD ADHESIVES	C-7558	5-21887	08/19/88	096	9999 FLUSHING LIQUID HOLD TANK (TK-128)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		0.0000028 GRAMS/SECOND, 0.000022 LBS/HR NOR 0.000055 TONS/YEAR **
52	WINDSHIELD ADHESIVES	C-7559	5-21888	08/19/88	097	9999 POLYMERS HOLD TANK (TK-102)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		0.0207 GRAMS/SECOND, 0.0154 LBS/HR NOR 0.0385 TONS/YEAR **
53	WINDSHIELD ADHESIVES	C-7560	5-21889	08/19/88	098	9999 POLYMER REACTOR (TK-100)	CARBON ADSORBER Z-103 AND VAPOR CONDENSOR		0.0356 GRAMS/SECOND, 0.0264 LBS/HR NOR 0.066 TONS/YEAR OF TOLUENE
					"				0.0000092 GRAMS/SECOND, 0.0000068 LBS/HR NOR 0.000017 TONS/YEAR OF TDI **
54	WINDSHIELD ADHESIVES	C-7561	5-21890	08/19/88	099	9999 TOLUENE STORAGE TANK (TK-133)	NONE		0.008 LBS/HR NOR 0.034 TONS/YR **
55	WINDSHIELD ADHESIVES	C-7562	5-21891	08/19/88	100	9999 POLYOL STORAGE TANK (TK-131)	NONE		0.31 LBS/HR NOR 1.36 TONS/YR **
56	WINDSHIELD ADHESIVES	C-7563	5-21892	08/19/88	101	9999 METHANOL STORAGE TANK (TK-132)	NONE		0.008 LBS/HR NOR 0.034 TONS/YR **
57	WINDSHIELD ADHESIVES	C-7564	5-21893	08/19/88	102	9999 TDI STORAGE TANK (TK-130)	NONE		0.0000204 LBS/HR NOR 0.0000894 TONS/YR **
	WINDSHIELD ADHESIVES		****		103	WAREHOUSE RECIRCULATION TANK (TNK 1 & TNK 2)	NONE		
	WINDSHIELD ADHESIVES	PENDING			401	PHOSPHATE LIQUID PRODUCTS (TANKS 123, 128, 129)	PROCESS SCRUBBER		
	WINDSHIELD ADHESIVES	PENDING			402	DRY PRODUCT BLENDER AIR PICKUPS	BAGHOUSE		

03/12/92

** FROM 09/02/87 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
****OPERATING PERMIT NOT REQUIRED AS PER 12/20/89 WAYNE COUNTY AIR POLLUTION CONTROL DIVITION LETTER.

All equipment removed from service

(20)

AIR PERMIT INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
WINDSHIELD ADHESIVES	PENDING			403	DRY PRODUCT BLENDER HOT BOX	NONE		
WINDSHIELD ADHESIVES	PENDING			404	NITRIC ACID STORAGE TANK	NONE	1,000 gal	
WINDSHIELD ADHESIVES	PENDING			405	PHOSPHORIC ACID STORAGE TANK	SCRUBBER	4,000 gal	

03/12/92

All equipment removed from service

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AIR PERMIT
INFORMATION

BASF CORPORATION CHEMICALS DIVISION
WYANDOTTE SITE

	PLANT	INSTALLATION PERMIT NO.	OPERATING PERMIT NO.	DATE ISSUED	SOURCE I.D.	VENT DESCRIPTION	CONTROL EQUIPMENT	RATED CAPACITY	MAXIMUM ALLOWABLE EMMISSIONS
82	ELASTOGRAN MACHINERY	C-8897	C-9592	06/03/92	120	ELASTOGRAN MIXING HEAD CLEANING OPERATION **	NONE	5,400 CFM	0.06 LBS/HR NOR 254 LBS/YR OF ETHYLENE GLYCOL MONOMETHYL ETHER *

06/03/92

* FROM 05/23/90 WAYNE COUNTY AIR POLLUTION CONTROL DIVISION LETTER.
** EQUIPMENT RELOCATED TO 13TH STREET 01/92, PERMIT C-9592

HISTORICAL
Air

No. C-5580 Issued: 10-1-80 BASF Wyandotte North Works 1609 Biddle Avenue Wyandotte, Michigan	Installation of a stand-by process steam generator to be used during winter months, only in the event of an interruption in steam supply from the North Works Boiler House. (Mobile) Rated - 30,000 lbs/hr steam or 36.6 MM Btu/hr heat input. Fuel = 300 gal/hr of #2 oil. Opn=48 hrs/yr (expected). This permit supercedes Permit No. C-5316 issued 12-18-79 and cancelled 7-30-80.	Allowable Emissions: #2 Oil fired steam generators are expected to be insignificant source of particulate and SO_2 <20% Opacity Expected Emissions: 0.0144 tons/yr part. 0.311 tons/yr SO_2 <20% Opacity Impact: Insignificant Basis: 1, 3 & 5.
mit No. C-4969 ued: January 5, 1979 F Wyandotte 9 Biddle Avenue ndotte, Michigan	~~Installation Of a fabric filter to replace existing multiclone and scrubber control system for existing CMC Dryer. 12000 SCFM. 10 t/d CMC produced.~~ 2.28 #/hr × 8760 hr/yr = 19,972.8 #/yr = 9.99 TPY	Allowable Emissions: <20% Opacity 2.28#/hr particulate 0.04# part./1000# Expected Emission: 0% Opacity 0.002# part./1000# 0.48 t/yr particulate Impact: Reduction 1.95 t/yr Particulate Basis: 3, 4 & 5.
mit No. C-4970 ued: January 5, 1979 F Wyandotte 9 Biddle Avenue ndotte, Michigan	~~Rearrangement of existing wet scrubber to eliminate control of CMC Dryer and control only the existing CMC reactor vent. 3000 SCFM. 10 T/D CMC produced.~~ $\frac{0.17\#}{1000\#} \times \frac{0.076\#}{ft^3} \times \frac{3000 ft^3}{min} \times \frac{60 min}{hr} \times \frac{8760 hr}{hr}$ = 20,372.3 #/yr = 10.19 TPY	Allowable Emissions: <20% Opacity 0.17# part./1000# Expected Emissions: 0% Opacity 0.05#/1000# 0.03 T/Yr particulate Impact: No change. Existing process. Basis: 3, 4 & 5.
No. C-4347 Issued: 7-7-77 BASF-Wyandotte Corp. 1609 Biddle Wyandotte, Michigan	~~Replacement of an existing third stage, wet scrubber control for two exhaust streams from the Carboxymethyl Cellulose (Carbose) batch manufacturing process. The first stage controls are two separate single cyclones whose exhausts are combined. The secondary control is a multiple cyclone and is followed by the scrubber.~~ 1400 SCFM 1000 #/hr Carbose 2.58 #/hr × 8760 hr/yr = 22,600.8 # = 11.3 TPY	Allowable Emission: 2.58 #/hr particulate 10.22 T/yr particulate <20% opacity Expected Emission: 2.40 #/hr particulate 9.50 T/yr particulate 0% opacity Impact: No change Basis: 3,4,5
No. C-4348 Issued: 7-15-77 BASF-Wyandotte Corp. 1609 Biddle Wyandotte, Mi.	~~Installation of a wet Impingement scrubber for control of a process to make Granular Silicated Caustic~~ 2000 CFM See permit No. C-4349 for Silicated Caustic Process.	Allowable Emissions: 2.58 #/hr particulate 0.28 #part./10^3# 8.0 tons part/year Expected Emissions: 0.11 #part./10^3# 3.0 tons part./year Impact: Slight

1609 Biddle

HISTORICAL
Air

o. C-4673 ssued: 2-28-78 ASF-Wyandotte Corp. 609 Biddle yandotte, Michigan	Installation of steam-heated Trump bicarb dryer controlled by a fabric filter collector (See Permit No. C-4674). 50 T/D Nominal Capacity of dryer.	See Permit No. C-4674 for impact assessment.
o. C-4674 ssued: 2-28-78 ASF-Wyandotte Corp. 509 Biddle yandotte, Michigan	Installation of baghouse for control of a new Trump bicarb dryer. 7500 C.F.M. $\frac{.20\#}{1000\#} \times \frac{0.076\#}{ft^3} \times \frac{7500 ft^3}{min} \times \frac{60 min}{hr} \times \frac{8760 hr}{hr}$ $= 59{,}918.4\#/yr = 29.96$ TPY	Allowable Emissions: 0.20 #part/10^3# 27.16 tons part/yr <20% Opacity Expected Emissions: 0.094 #part/10^3# 12.81 tons part/year 0% Opacity Impact: Slight *See note on permit C-4675 Basis: 3, 4, 5.
o. C-4675 ssued: 2-28-78 ASF-Wyandotte Corp. 509 Biddle yandotte, Michigan	Installation of a baghouse to control an <u>existing</u> Wyssmont Bicarb dryer. 14300 SCFM 100 T/D Nominal Capacity of dryer. Reduction of emissions	Allowable Emissions: 0.20 #part/10^3# 51.81 tons part/yr. <20% Opacity Expected Emissions: 0.036 #part/10^3# 9.57 tons part/yr. 0% Opacity Impact: Slight *Based on uncontrolled emissions from the existir Wyssmont Dryer a net reduction in emissions from this process would be 935 tons/year Basis: 3, 4, 5.
No. C-4873 Issued: 10-6-78 BASF-Wyandotte Corp. 1609 Biddle Wyandotte, Michigan	Installation of two alternately used fabric filter collectors to <u>replace</u> an existing smaller fabric filter collector and standby wet scrubber as secondary controls on an ash handling system, the primary control is a cyclone collector. 120 T/D Fly-ash 1800 SCFM	Allowable Emissions: 12#/hr particulate (Process wt. basis) 2.5# part./1000# 20% Opacity Expected Emissions: 0.38#part./1000# 1.8#/hr particulate 7.9 t/yr particulate 0% Opacity Impact: Slight reduction in particulate emissions. Basis: 3, 4 & 5.

Chemicals Division

BASF

CERTIFIED MAIL
P-596 485 220

July 8, 1987

RECEIVED
JUL 13 1987
SURFACE WATER QUALITY

Mr. David Dennis, Chief
Compliance 2 Section
Groundwater Quality Division
Michigan Dept. Natural Resources
Stevens T. Mason Building
Lansing, MI 48909

Dear Mr. Dennis:

Re: Civil Action No. 83-CV-4712-DT

Pursuant to Section XI.B and Appendix C, Parts F and G of the subject Consent Decree, BASF is hereby reporting analytical results of groundwater samples taken from each extraction system on June 29, 1987.

In preparing this report, a review of the Consent Decree revealed the Consent Decree's text on page 4 of Appendix C and Table 1 on page 7 are inconsistent as related to Area D monitoring parameters. This report complies with the "text" requirements.

	Remedial Area			
Parameter (mg/l)	A	B	C	D
1,2 dichloropropane	45			165
tetrachloroethylene	4522			6
hexachlorobenzene	4		<1	
carbon tetrachloride		1		
hexachlorobutadiene			none detected	
trichloroethylene			195	none detected

Yours very truly,

H. D. Roush
Manager
Quality Assurance and
Environmental Affairs

mh

cc: RSchrameck, MDNR
KFry
CWAxce

1987

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

1609 Biddle

HISTORICAL AIR

(3)

o. C-5023 ssued: August 9, 1979 .A.S.F. Wyandotte Corp. 609 Biddle Avenue yandotte, Michigan	Installation of a dust collector for control of a mixing tank of NWBH Bisulfite System. 800 SCFM.	Allowable Emissions: 0.407 tons part./year <20% Opacity Expected Emissions: 0.128 tons part/year 0% Opacity <40 PPM SO_2 Impact: Insignificant Basis: 3, 4 & 5.
o. C-5158 ssued: August 9, 1979 ASF Wyandotte Corp. 509 Biddle Avenue yandotte, Michigan	Installation of a baghouse on a lime storage silo 1600 CFM	See Permit C-5161 for Impact Assessment
o. C-5159 ssued: August 9, 1979 SF Wyandotte 09 Biddle Avenue yandotte, Michigan	Installation of a baghouse on a lime truck loading station. 2300 CFM.	See Permit No. C-5160 for Impact Assessment.
o. C-5160 ssued: August 9, 1979 ASF Wyandotte Corp. 509 Biddle Avenue yandotte, Michigan	Installation of a truck loading station for lime. 250 to 350 tons/day	Allowable Emissions: 0.823 tons part/year <20% Opacity Expected Emissions: 0.028 tons part/year 0% Opacity Impact: Insignificant Basis: 3, 4 & 5.
No. C-5161 Issued: August 9, 1979 BASF Wyandotte Corp. 1609 Biddle Avenue Wyandotte, Michigan	Installation of a lime storage silo. 250 to 350 tons/day	Allowable Emissions: 0.823 tons part./year <20% Opacity Expected Emissions: 0.028 tons part/year 0% Opacity Impact: Insignificant Basis: 3, 4 & 5.
o. C-4309 ssued: 7-15-7[illegible] ASF-Wyandotte Corp. 609 Biddle yandotte, Mi.	Installation of process equipment to manufacture Granular, silicated caustic. Process dust controlled by an impingement type wet scrubber. See Permit No. C-4348 for Wet Scrubber Control.	See Permit No. C-4349 for Impact Assesment

HISTORICAL Air

No. C-5316 Issued: 12-18-79 BASF Wyandotte North Works 1609 Biddle Avenue Wyandotte, Michigan	Installation of a stand-by process system generator to be used during winter months, only in the event of an interruption in steam supply from the North Works Boiler House. (Mobile) Rated-30,000 lbs/hr steam or 36.6 MM Btu/hr heat input. Fuel-300 gal/hr of #2 oil. Opn-48 hrs/yr (expected). CANCELLED 7/30/80	Allowable Emissions: #2 Oil fired steam generators are expected to be insignificant sour of particulate and SO_2. <20% Opacity Expected Emissions: 0.0144 tons/yr part 0.311 tons/yr SO_2 <20% Opacity Impact: Insignificant Basis: 1, 3 & 5.

HISTORICAL | Air

No. C-6565 Approved on 8/2/84 Transformer Consultants a Div. of S.D. Myers P. O. Box 4724 Akron, OH.	Siting and operation of PCB destruction unit at 1609 Biddle, Wyandotte with conditions. 1 day operation	**Allowable Emissions:** 57.4 mg/m^3 Benzene, 18ppm total hydrocarbon $\angle$20% opacity **Expected Emissions:** $\angle$57.4 mg/m^3 benzene $\angle$18 ppm total hydrocarbon $\angle$20% opacity **Impact:** Insignificant **Basis:**

STATE OF MICHIGAN MI-196-08

B2800

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES
STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909
HOWARD A. TANNER, Director

March 31, 1982

Mr. Brian Morrison
Industrial Economics
30 Boylston Street
Cambridge, Massachusetts 02138

Dear Mr. Morrison:

I have enclosed copies of emission data from Michigan's Emission Inventory for Dow Chemical Company, Midland, and BASF Wyandotte, Wyandotte. I have also enclosed a set of instructions for Emission Inventory reporting (they contain tables you will need to interpret the data) and a marked sample of data.

Dow Chemical, Midland Establishment numbers	BASF Wyandotte, Wyandotte Establishment numbers
A4033	B2800
B3628	B4359
B3629	
B4029	

The data show annual emissions in tons, for 1981. Totals for various categories of emissions (see Table III) are at the end of each establishment number. I am not able to provide you with any more specific emission data.

We also have extensive plant files and permit files at this office. These may contain more specific information. These files are available for inspection during office hours; feel free to review them. Please make an appointment with our Compliance Branch (322-1335) to review plant files, or with the Engineering Section (322-1333) to review permit files.

Mr. Brian Morrison
Page Two
March 31, 1982

Please remember that complete files on BASF Wyandotte, Wyandotte, will be at the Wayne County Health Department Air Pollution Control Division.

If you have any questions about this information, please call me at (517) 322-1339.

Sincerely,

Paul L. Schleusener

Paul L. Schleusener
Environmental Engineer
Air Quality Division

PLS:nm

Enc.

cc: Plant files (2)
Nancy Hein (2)

BASF Wyandotte Corporation
North Works Power Plant
1609 Biddle Avenue
Wyandotte, Michigan

Date of Inspection: February 9, 1982

I. STATE OF CONFIDENTIALITY CLAIM

No confidentiality claims were made by the plant representatives during the inspection, and no confidentiality agreements were signed by the inspection team.

II. ATTENDEES

For BASF Wyandotte Corporation:

Mr. Charles W. Axce, General Manager, Wyandotte Site

For Pacific Environmental Services, Inc. (representing U.S. EPA Region V):

Mr. Eddy Lin, Environmental Engineer

Mr. Ronald Kolzow, Environmental Scientist

For Downriver Air Pollution Control Office, Wayne County Dept. of Health:

Mr. Wilson Boyd, Combustion Equipment Inspector

III. PLANT INSPECTION

A. Summary of Facility Activity

The PES inspection team visited BASF Wyandotte to verify the North Works Power Plant shutdown per U.S. EPA Region V instructions. The following information was obtained. The BASF Wyandotte Corporation North Works Power Plant has utilized five coal-fired boilers (Nos. 7, 9, 10, 11, and 12) for process steam. In the past few years, only boiler Nos. 10, 11, and 12 were used. All of the boilers above are described in Table III-1.

Table III-1. BOILER DATA (COAL-FIRED)

Unit:	No. 7	No. 9	No. 10	No. 11	No. 12
Operational Status:	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown
Year Installed:	Unknown	Unknown	1948	1966	1966
Rated Heat Input: (10^6 Btu/hr)	210	330	330	330	330
Type of Fuel:	- - - - - - - - - Pulverized Bituminous Coal - - - - - - - - -				

The boilers described have been shutdown since November 15, 1981. Mr. Charles Axce of BASF Wyandotte Corporation informed the inspectors that bids for demolition of the defunct facility (Photograph No. 1, Attachment 1) are to be submitted by March 1, 1982. A letter of verification of the shutdown of the North Works Power Plant has been submitted by Mr. H.D. Roush, Manager of Environmental Protection, Health, and Safety, BASF Wyandotte Corporation, and is presented in Attachment 2.

This facility now employs four natural gas-fired (No. 6 fuel oil backup) boilers to supply process steam. The boilers have been in operation since November 15, 1981 and are described in Table III-2. The No. 6 fuel oil is stored in one above-ground 147,000 gallon tank.

Table III-2. PACKAGE BOILER DATA*

Description:	Nos. 1, 2, 3, and 4 Steam Generators
Manufacturer:	Zurn Industries, Inc.
Model No.:	49.9M Keystone
Rating:	49.9 x 10^6 Btu/hr each
Stack Height:	150 feet
Fuel:	Natural Gas (No. 6 fuel oil standby)

*Boiler Nos. 1, 2, 3, and 4 are identical units

B. <u>Visible Emission Observation</u>

A visible emission observation of the boiler stack indicated an opacity of zero percent (other than uncombined water vapor, Photograph No. 2, Attachment 2).

APPENDIX G

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT
REQUESTED: P 121 664 350

March 12, 1993

Roger Gillard
Wayne County Department of Public Works
3501 Henry Ruff
Westland, MI 48185

SUBJECT: Spill Notification Report

Dear Mr. Gillard:

On March 8, 1993, the BASF Corporation facility at Wyandotte, Michigan experienced a non-routine batch discharge of TDA Waste Material. Verbal notification was provided to you on that date. As discussed, this notification is submitted within 5 days and provides the following details:

- Unit - Central R&D, Isocyanates Research
- Discharge timing - 11:00 a.m. to 11:05 a.m
- Released material -

Chemical	Quantity (lb)	CMR
2,4-toluene diamine	0.2	Yes
ethanol	0.4	No
acetone	0.2	No

- Cause - During filtration of pyrophoric solid catalyst from a solvent mixture, the filter contents ignited. A container of Waste TDA Material was located close enough to also ignite. The fire was immediately extinguished in a sink where the release occurred. There were no resulting damages or injuries.
- Corrective Action - Revise standard operating procedures for filtration activity to clarify: (1) clear area of flammable materials, (2) decant as much flammable liquid as possible from solvent-solid mixture and add water to reduce flammability before filtration.

If you are in need of any additional information, please call me at 246-5131.

Sincerely,

Charles E. Anderson

Charles E. Anderson
Ecology Services Engineer

BASF Corporation

BASF

December 15, 1992

RETURN RECEIPT REQUESTED
P 633 102 203

Walter S. Syrkowski
Wayne County Department of Public Works
740 Central Avenue
Wyandotte, Michigan 48192

SUBJECT: Upset Noncompliance Report

Dear Mr. Syrkowski:

On December 10, 1992, the BASF Corporation facility at Wyandotte, Michigan experienced a process upset resulting in temporary noncompliance with discharge limitations. As specified in Part II, Section B.4. of the Wastewater Discharge Permit, verbal notification was provided to Dan Helm by Charles Anderson on December 10, 1992. Also as specified, this written notification is submitted within five days and provides the following details:

- Production Unit - Vitamins Complex
- Uncombined discharge description - resulting wastewater (~5 gal/min) after filtration to remove zinc hydroxide precipitate
- Cause of upset - filter paper became tangled around rollers resulting in no coverage on the filter wheel; note that the filter cake continued to accumulate without the paper and was collected as normal
- Timing of upset - one hour, from 12:00 midnight until 1:00 a.m.
- Relevant discharge limitation - 15 mg/l total zinc
- Noncompliance description in uncombined discharge - total zinc in mg/l: 11,000 for maximum and 500 for 24-hour average
- Combined discharge location and flowrate - main sample point #1, Alkali St. near EMB Building; ~290 gal/min for 24-hour average
- Immediate response activity - reinstalled filter paper
- Action to prevent recurrence - more frequent inspections during operation of filter wheel
- Long term preventative measure - Waste Elimination Project will eliminate the need for this filter system

If you are in need of any additional information, please call me at 246-6209.

Sincerely,

Doug Thiel

Douglas P. Thiel
Manager, Quality & Ecology Services
Ecology Services Engineer

BASF Corporation

BASF

October 27, 1992

Attn: MST. Hollmeyer
Commanding Officer
Coast Guard Marine Safety Office
110 Mt. Elliot Ave.
Detroit, MI 48207

Dear Mr. Hollmeyer:

As requested, please find attached a copy of BASF's internal report regarding the incident which occurred on August 1, 1992 at our North Works Site. If you have any further questions regarding this incident please contact me at 246-6209.

Sincerely,

D. P. Thiel
Manager Quality & Ecology Services

c:\nld\hollmey.cdl

bc: F. DeLisle

Appendix II

BASF CORPORATION
ENVIRONMENTAL INCIDENT REPORT
WYANDOTTE, MICHIGAN SITE

UNIT MANAGER'S RESPONSE

Responsible Unit: NORTH WORKS IDLE

Date and time incident began: 08-01-92 (month) (day) (year) (Date) 15:30 (Time) _ A.M. X P.M.

Date and time incident ceased: 08-01-92 (month) (day) (year) (Date) 15:30 (Time) _ A.M. X P.M.

Quantity of material lost: 5-10 GALLONS

Identification of material lost (product name) COOKING OIL

Briefly describe the circumstances that led up to the release (if helpful include a sketch). A CONTRACTOR KNOWN AS MILLION-IN-ONE SERVICES WAS WORKING ON SITE AS A SUBCONTRACTOR TO ABC PAVING COMPANY CLEANING THE 6'X6' BOX SEWER. THEY SWITCHED PUMPING TRUCKS DUE TO EQUIPMENT PROBLEMS AND WHEN THEY EMPTIED THE TRUCK INTO THE RETENTION AREA DIRECTLY EAST OF THE VITAMINS ADMINISTRATION BUILDING, 5 TO 10 GALLONS OF WASTE COOKING OIL WAS ALSO PLACED INTO THE AREA.

Check the items that describe the end effects of the release event. (Check as many as apply.)

a. X Spill
b. _ Vapor release
c. _ Explosion
d. _ Fire
e. _ Other (describe)

Quantity of each substance released to each media. Specify the measurement unit. Attach additional pages as needed.

Chemical	Media	Quantity	Unit
1a. Name ______	Air		
b. CAS # ______	Surface Water		
c. Physical state ______	Land	5-10	GAL
d. Concentration ______	POTW		

Chemical	Media	Quantity	Unit
2a. Name ____	Air	____	____
b. CAS # ____	Surface Water	____	____
c. Physical state ____	Land	____	____
d. Concentration ____	POTW	____	____

Please describe the immediate response activities taken to contain or minimize the release.

THE MATERIAL AND SURROUNDING SOIL WAS COLLECTED IN A DRUM AND SENT TO THE ECOLOGY WASTE STORAGE BUILDING FOR DISPOSAL

Describe the immediate equipment repairs and/or replacements, management practices, operational changes, etc., made as a result of the release.

PUMPING TRUCKS WILL BE INSPECTED FOR CLEANLINESS BEFORE BEING ALLOWED TO WORK ON THE WYANDOTTE SITE. PURCHASING WILL REQUEST CLEAN TRUCKS AS PART OF ALL PURCHASE ORDERS.

What additional long-term preventative measure(s) will be taken to minimize the possibility of recurrence?

A CONTRACTOR EVALUATION WILL BE PERFORMED ON MILLION-IN-ONE SERVICES BEFORE THEY ARE USED AGAIN ON THIS SITE TO MAKE OTHER DEPARTMENTS AWARE OF PROBLEMS EXPERIENCED.

Unit Manager's Signature

ECOLOGY SERVICES DEPARTMENT COMMENTS

Regulatory Agencies Notified:

EPA ____ DNR ____
Coast Guard ____ Wayne Co. POTW ____
Not Applicable x

Reportable Quantities:

CERCLA ____
EPCRA ____
Michigan CMR ____
Not Applicable x

General Comments:

There were no official regulatory notifications made regarding this spill although the U.S. Coast Guard investigated the incident in response to an anonymous telephone call.

Ecology Services Staff Member

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
Oyinsan: P 257 499 381
Parsons: P 257 499 382

October 17, 1991

Mr. Oladipo Oyinsan
Michigan Department of Natural Resources
Environmental Response Division
38980 Seven Mile Road
Livonia, MI 48152

Mr. Dowe Parsons
Michigan Department of Natural Resources
Environmental Response Division
P. O. Box 30028
Lansing, MI 48909

Gentlemen:

On October 8, 1991, this facility experienced a release of Acrylonitrile requiring notification under Act 245 of the Public Acts of Michigan. A telephone report was made to PEAS Operator #4 after the incident was discovered. BASF is hereby submitting the attached report on the incident as required by Act 245.

If you are in need of any additional information, please call me at (313) 246-6834.

Sincerely,

Carlene D. LaScola

C. D. LaScola
Ecology Services Coordinator

mh
att.

bc: MBuller
GDurst
MEhrlich
DFigg
HMcDonald
RRosen
DThiel

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been issued which require that all owners, managers, or operators of vessels, oil storage, or on-land facilities shall notify the Water Resources Commission or his authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date: 10/17/91

Company Name: BASF CORPORATION

Location of Loss (Be Specific): 1609 Biddle Avenue
Wyandotte, MI 48192

Material Lost: Acrylonitrile

Amount: 6-8 lbs.

Name of Surface Water Involved: NA

Date Loss Was Discovered: 10/8/91

Time of Discovery: 8:30 a.m.

Name of Department of Natural Resources Representative Contacted: Operator #4

Telephoned or Telegraphed by Whom: Doug Thiel

Time: 11:13 a.m.

Cause of Loss (Include Type of Equipment and Other Details):
A rail tank car received from BP Chemical was found to be leaking from the bottom valve.

Nature of Loss (Include Complete Description of Damage):
The volume of material lost to the environment was calculated to be approximately 6-8 lbs. There was no additional loss of property or known adverse human health or environmental effects as a result of this release.

Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.):
A packing nut was tightened to eliminate the leak. Bottom valves on Acrylonitrile tank cars have been prohibited through a revision to the supplier specification.

Company Name: BASF CORPORATION

By (Signature): Carlene LaCroix

Return this form to: Michigan Department of Natural Resources
Environmental Response Division
Attention: Remedial Action Section
P.O. Box 30028
Lansing, MI 48909
24-Hour Emergency Notification Number
517/373-8481
800/292-4706 (In state)

R4616

- **BASF Corporation**

BASF

May 29, 1992

Mr. Ron Rees
Wayne County Public Works Division
797 Central Avenue
Wyandotte, MI 48192

Dear Mr. Rees:

On May 26, 1992, this facility experienced a "slug" discharge to the Wayne County Sanitary Sewer System which required verbal and written notification to your office. Oral notification was provided to your office on May 26, 1992 at 2:35 p.m. This letter serves as the written follow-up notification required under the Wayne County Sewer Ordinance, adopted March 20, 1986, Article V, Sections 2.04(c), (d) and 5.08.

Chemical Name/CAS Number/Concentration:	Nitric Acid/7697-37-2/34%)
Date/Time of Discharge:	May 26, 1992, between 1:00-2:00 p.m.
Location of Discharge:	Small Scale Production Area

Immediate and Long-Term Corrective Actions: A quality and safety review of the process will be performed before production is resumed with careful attention to all items on the quality checklist for these reviews, including storage of acid in the proper type of drums.

If you are in need of any additional information, please call me at (313) 246-6209, or Karen Granata at (313) 246-6429.

Sincerely,

Don Thiel

D. P. Thiel
Manager, Quality & Ecology Services

mh

bc: GTDurst
CDLaScola
JFLouvar
RRosen

BASF Corporation

BASF

May 29, 1992

Mr. Ron Rees
Wayne County Public Works Division
797 Central Avenue
Wyandotte, MI 48192

Dear Mr. Rees:

On May 26, 1992, this facility experienced a "slug" discharge to the Wayne County Sanitary Sewer System which required verbal and written notification to your office. Oral notification was provided to your office on May 26, 1992 at 2:35 p.m. This letter serves as the written follow-up notification required under the Wayne County Sewer Ordinance, adopted March 20, 1986, Article V, Sections 2.04(c), (d) and 5.08.

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Date/Time of Discharge: May 26, 1992, between 1:00-2:00 p.m.
Location of Discharge: Small Scale Production Area
Immediate and Long-Term Corrective Actions: A quality and safety review of the process will be performed before production is resumed with careful attention to all items on the quality checklist for these reviews, including storage of acid in the proper type of drums.

If you are in need of any additional information, please call me at (313) 246-6209, or Karen Granata at (313) 246-6429.

Sincerely,

Don Thiel

D. P. Thiel
Manager, Quality & Ecology Services

mh

bc: GTDurst
CDLaScola
JFLouvar
RRosen

BASF Corporation **BASF**

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 257 499 271

October 12, 1990

Mr. Mark Sparks
LEPC Chairperson
Title III Local Emergency Planning Commission
10250 Middlebelt Road
Detroit, MI 48242

Dear Mr. Sparks:

This facility experienced a release of an extremely hazardous substance requiring notification under Section 304 of the Emergency Planning and Right-to-Know Act. Verbal notification was provided to the Local Emergency Planning Committee (Mr. Michalski of the Wayne County Sheriff's Department) on October 5, 1990 at approximately 10:00 P.M. This letter serves as the written follow-up notification required under 40 CFR 355.40(b)(3).

Incident Details

Chemical Name/CAS Number:	Propylene Oxide / 75-56-9
Quantity Released:	3,500 pounds
Time and Duration of Release:	October 2, 1990 at 21:00 to October 5, 1990 at 19:00
Environmental Medium:	Surface Water (Detroit River)
Environmental Conditions:	Not Applicable
Anticipated Acute or Chronic Health Risks:	None
Medical Attention Requirements:	Not Applicable

Cause of Incident: After completing routine maintenance on the No. 8 Reactor propylene oxide pipeline header, a bleed valve was inadvertently left open. The flow was not immediately detected due to the failure of the oxide flow switch alarm. A total of 3,500 pounds of propylene oxide was accidentally released through the Polymers Plant NPDES Outfall 001 to the Detroit River during the time period October 2-5. The concentrations of propylene oxide in the wastewater samples collected during the time period of this incident were well within the normal range experienced during the year.

Immediate Corrective Action Taken: The bleed valve was shut immediately after discovery. The continuously monitored total organic carbon measurements at the outfall were below the NPDES limit during the time period of this spill incident.

Preventive Action Plan: This bleed valve direct connection to the wastewater system was eliminated to prevent recurrence.

If you are in need of any additional information, please call me at (313) 246-6209.

Sincerely,

D. P. Thiel, CIH
Manager
Quality & Ecology Services Department

kmb

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 257 499 269

October 12, 1990

Mr. Kent Kanagy
Michigan Department of Natural Resources
State Emergency Response Commission
P. O. Box 30028
Lansing, MI 48909

Dear Mr. Kanagy:

This facility experienced a release of an extremely hazardous substance requiring notification under Section 304 of the Emergency Planning and Right-to-Know Act. Verbal notification was provided to the MDNR's Lansing Environmental Response Division office (Operator 22, May, and Mr. Stenzel of the Emergency Response Division) on October 5, 1990 at approximately 10:00 P.M. This letter serves as the written follow-up notification required under 40 CFR 355.40(b)(3).

Incident Details

Chemical Name/CAS Number:	Propylene Oxide / 75-56-9
Quantity Released:	3,500 pounds
Time and Duration of Release:	October 2, 1990 at 21:00 to October 5, 1990 at 19:00
Environmental Medium:	Surface Water (Detroit River)
Environmental Conditions:	Not Applicable
Anticipated Acute or Chronic Health Risks:	None
Medical Attention Requirements:	Not Applicable

Cause of Incident: After completing routine maintenance on the No. 8 Reactor propylene oxide pipeline header, a bleed valve was inadvertently left open. The flow was not immediately detected due to the failure of the oxide flow switch alarm. A total of 3,500 pounds of propylene oxide was accidentally released through the Polymers Plant NPDES Outfall 001 to the Detroit River during the time period October 2-5. The concentrations of propylene oxide in the wastewater samples collected during the time period of this incident were well within the normal range experienced during the year.

Immediate Corrective Action Taken: The bleed valve was shut immediately after discovery. The continuously monitored total organic carbon measurements at the outfall were below the NPDES limit during the time period of this spill incident.

Preventive Action Plan: This bleed valve direct connection to the wastewater system was eliminated to prevent recurrence.

1609 Biddle Avenue, Wyandotte, Michigan 48192-3799 (313) 246-6100

If you are in need of any additional information, please call me at (313) 246-6209.

Sincerely,

D. P. Thiel, CIH
Manager
Quality & Ecology Services Department

kmb

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 257 499 270

October 12, 1990

Ms. Hae Jin Yoon
Michigan Department of Natural Resources
Surface Water Quality Division
38980 Seven Mile Road
Livonia, MI 48152

Dear Ms. Yoon:

This facility experienced a release of propylene oxide, an extremely hazardous substance, requiring notification under Section 304 of the Emergency Planning and Right-to-Know Act. Verbal notification was provided to Mr. Stenzel of the MDNR's Lansing Environmental Response Division office on October 5 at approximately 10:00 p.m. This letter is being sent to you as requested by Mr. Stenzel.

Incident Details

Chemical Name/CAS Number:	Propylene Oxide / 75-56-9
Quantity Released:	3,500 pounds
Time and Duration of Release:	October 2, 1990 at 21:00 to October 5, 1990 at 19:00
Environmental Medium:	Surface Water (Detroit River)
Environmental Conditions:	Not Applicable
Anticipated Acute or Chronic Health Risks:	None
Medical Attention Requirements:	Not Applicable

Cause of Incident: After completing routine maintenance on the No. 8 Reactor propylene oxide pipeline header, a bleed valve was inadvertently left open. The flow was not immediately detected due to the failure of the oxide flow switch alarm. A total of 3,500 pounds of propylene oxide was accidentally released through the Polymers Plant NPDES Outfall 001 to the Detroit River during the time period October 2-5. The concentrations of propylene oxide in the wastewater samples collected during the time period of this incident were well within the normal range experienced during the year.

Immediate Corrective Action Taken: The bleed valve was shut immediately after discovery. The continuously monitored total organic carbon measurements at the outfall were below the NPDES limit during the time period of the spill incident.

Preventive Action Plan: This bleed valve direct connection to the wastewater system was eliminated to prevent recurrence.

Ms. Hae Jin Yoon
Michigan Dept. of Natural Resources
Surface Water Quality Division
August 12, 1990
Page 2

If you are in need of any additional information, please call me at (313) 246-6209.

Sincerely,

D. P. Thiel, CIH
Manager
Quality & Ecology Services Department

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 257 499 272

October 12, 1990

Mr. David McNamara
U. S. Coast Guard
Marine Safety Office
Foot of Mt. Elliott
Detroit, MI 48207

Dear. Mr. McNamara:

This facility experienced a release of propylene oxide which exceeded the CERCLA and SARA reportable quantities for this substance. Verbal notification was provided to the National Response Center (Mr. Wischman, Report #42521) on October 5, 1990 at approximately 10:00 p.m. This letter is being sent to you as requested.

Incident Details

Chemical Name/CAS Number:	Propylene Oxide / 75-56-9
Quantity Released:	3,500 pounds
Time and Duration of Release:	October 2, 1990 at 21:00 to October 5, 1990 at 19:00
Environmental Medium:	Surface Water (Detroit River)
Environmental Conditions:	Not Applicable
Anticipated Acute or Chronic Health Risks:	None
Medical Attention Requirements:	Not Applicable

Cause of Incident: After completing routine maintenance on the No. 8 Reactor propylene oxide pipeline header, a bleed valve was inadvertently left open. The flow was not immediately detected due to the failure of the oxide flow switch alarm. A total of 3,500 pounds of propylene oxide was accidentally released through the Polymers Plant NPDES Outfall 001 to the Detroit River during the time period October 2-5. The concentrations of propylene oxide in the wastewater samples collected during the time period of this incident were well within the normal range experienced during the year.

Immediate Corrective Action Taken: The bleed valve was shut immediately after discovery. The continuously monitored total organic carbon measurements at the outfall were below the NPDES limit during the time period of this spill incident.

Preventive Action Plan: This bleed valve direct connection to the wastewater system was eliminated to prevent recurrence.

1609 Biddle Avenue, Wyandotte, Michigan 48192-3799 (313) 246-6100

If you are in need of any additional information, please call me at (313) 246-6209.

Sincerely,

Doug Thiel

D. P. Thiel, CIH
Manager
Quality & Ecology Services Department

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 401 235 667

July 5, 1990

Mr. Michael Stenzel
Michigan Department of Natural Resources
Environmental Response Division
38980 Seven Mile Road
Livonia, MI 48152

Dear Mr. Stenzel:

On June 28, 1990, this facility experienced a release of #6 Fuel Oil requiring notification under Act 245 of the Public Acts of Michigan. Tim Jaski of the MDNR's Livonia office was notified promptly by telephone after the incident was discovered. BASF is hereby submitting the attached report on the incident as required by Act 245.

If you are in need of any additional information, please call me at (313) 246-6209.

Sincerely,

D. P. Thiel, CIH
Ecology Services Coordinator

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
LTBurkhart
HLMcDonald
KPadar
DLVanLewen

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been issued which require that all owners, managers, or operators of vessels, oil storage, or on-land facilities shall notify the Water Resources Commission or his authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date: 7/5/90

Company Name: BASF Corporation

Location of Loss (Be Specific):
1609 Biddle Avenue
Wyandotte, MI 48192

Material Lost: #6 Fuel Oil

Amount: 300-500 gal.

Name of Surface Water Involved: Ground Water

Date Loss Was Discovered: 6/28/90

Time of Discovery: 8:30 a.m.

Name of Department of Natural Resources Representative Contacted: Timothy Jaski

Telephoned or Telegraphed by Whom: Karen Padar

Time: 9:20 a.m.

Cause of Loss (Include Type of Equipment and Other Details):
The 3" stainless steel underground pipeline used for #6 Fuel Oil service to the Site's Steam Facility failed when pinholes developed in the pipe. The cause of the pinholes is currently under investigation.

Nature of Loss (Include Complete Description of Damage):
Loss of #6 Fuel Oil and costs associated with clean-up of spill. There was no additional loss of property or known adverse human health or environmental effects as a result of this release.

Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.):
The line will be replaced with either an above-ground line or double walled underground line.

Company Name: BASF Corporation

By (Signature): Gary Thiel

Return this form to: Michigan Department of Natural Resources
Environmental Response Division
Attention: Remedial Action Section
P.O. Box 30028
Lansing, MI 48909
24-Hour Emergency Notification Number
517/373-8481
800/292-4706 (In state)

R4616

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 401 235 666

July 5, 1990

Mr. Dowe Parsons
Michigan Department of Natural Resources
Environmental Response Division
P. O. Box 30028
Lansing, MI 48909

Dear Mr. Parsons:

On June 28, 1990, this facility experienced a release of #6 Fuel Oil requiring notification under Act 245 of the Public Acts of Michigan. Tim Jaski of the MDNR's Livonia office was notified promptly by telephone after the incident was discovered. BASF is hereby submitting the attached report on the incident as required by Act 245.

If you are in need of any additional information, please call me at (313) 246-6209.

Sincerely,

D. P. Thiel, CIH
Ecology Services Coordinator

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
LTBurkhart
HLMcDonald
KPadar
DLVanLewen

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been issued which require that all owners, managers, or operators of vessels, oil storage, or on-land facilities shall notify the Water Resources Commission or his authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date: 7/5/90

Company Name: BASF Corporation

Location of Loss (Be Specific): 1609 Biddle Avenue
Wyandotte, MI 48192

Material Lost: #6 Fuel Oil

Amount: 300-500 gal.

Name of Surface Water Involved: Ground Water

Date Loss Was Discovered: 6/28/90

Time of Discovery: 8:30 a.m.

Name of Department of Natural Resources Representative Contacted: Timothy Jaski

Telephoned or Telegraphed by Whom: Karen Padar

Time: 9:20 a.m.

Cause of Loss (Include Type of Equipment and Other Details)

The 3" stainless steel underground pipeline used for #6 Fuel Oil service to the Site's Steam Facility failed when pinholes developed in the pipe. The cause of the pinholes is currently under investigation.

Nature of Loss (Include Complete Description of Damage)

Loss of #6 Fuel Oil and costs associated with clean-up of spill. There was no additional loss of property or known adverse human health or environmental effects as a result of this release.

Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.)

The line will be replaced with either an above-ground line or double walled underground line.

Company Name: BASF Corporation

By (Signature): [signature]

Return this form to: Michigan Department of Natural Resources
Environmental Response Division
Attention: Remedial Action Section
P.O. Box 30028
Lansing, MI 48909
24-Hour Emergency Notification Number
517/373-8481
800/292-4706 (In state)

R4616

ɜASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
Parsons: P 257 499 383
Stenzel: P 257 499 384

October 21, 1991

Mr. Dowe Parsons
Michigan Department of Natural Resources
Environmental Response Division
P. O. Box 30028
Lansing, MI 48909

Mr. Michael Stenzel
Michigan Department of Natural Resources
Environmental Response Division
38980 Seven Mile Road
Livonia, MI 48152

Gentlemen:

Subject: Plan for Prevention of Recurrence of
Release of #6 Fuel Oil on June 28, 1990

On June 28, 1990, this facility experienced a small release of #6 Fuel Oil and notified T. Jaski of the MDNR's Livonia office by telephone. BASF also submitted a follow-up report on the incident to you in a letter dated July 5, 1990. The release was from a leaking underground fuel oil line. The fuel oil cleanup mentioned in the letter was completed by July 9, 1990.

A new fuel oil line was installed on October 4, 1991 to replace the one removed in July, 1990. The new fuel oil line is in an underground concrete vault to prevent a release of fuel oil to the environment in the future.

If you are in need of any additional information, please call me at (313) 246-6209.

Sincerely,

D. P. Thiel
Manager
Quality & Ecology Services Department

mh

bc: ACBickel
GTDurst
KPGranata

BASF Corporation **BASF**

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 401 235 662

July 3, 1990

Mr. Michael Maillard
Director, Enforcement Services
Wayne County Dept. of Health
Air Pollution Control Division
2211 East Jefferson
Detroit, MI 48207

Dear Mr. Maillard:

On June 28, 1990, this facility experienced a release of an extremely hazardous substance requiring notification under Section 304 of the Emergency Planning and Right-to-Know Act. Verbal notification was provided to the MDNR's Lansing Environmental Response Division office (Operator #4, Margo) and Mr. Grimes of the National Response Center on June 28, 1990 at approximately 4:55 p.m. This letter serves as the written follow-up notification required under 40 CFR 355.40(b)(3).

Incident Details

Chemical Name/CAS Number: Propylene Oxide / 75-56-9
Quantity Released: ~1,000 lbs.
Time and Duration of Release: 1600-1615
Released to What Environmental Medium: Primarily air (vapor release) but also minor (<10 lbs.) release to surface water (Detroit River).
Environmental Conditions: ESE winds at approximately 3 MPH, Temperature 22°C.
Anticipated Acute or Chronic Health Risks: None
Medical Attention Requirements: Not applicable

Cause of Incident: A garloc-type gasket failed between the No. 8 Reactor vent valve and Reactor nozzle. This resulted in a PO vapor release to the atmosphere. At the time of the incident, the No. 8 Reactor was in oxide addition with 47,000 pounds of the 57,000 pound propylene oxide addition in the reactor. The reactor was at operating conditions of 257°F. and 75 PSI when the leak in the vapor space developed.

Immediate Corrective Action Taken: The oxide additions to all reactors were shut down and the deluge system was activated to reduce chances of developing flammable vapor concentrations at ground level. The No. 8 Reactor was vented to atmospheric through the roof vent. The remainder of the PO in the reactor was evacuated to the oxide scrubber.

Preventive Action Plan: Several gaskets were replaced on the top of the No. 8 Reactor and the batch was completed. Gasket materials in EO and PO service are being checked and will be replaced with Teflon wound spirotallic gaskets wherever possible. Management personnel will review difficult to seal services and modify piping or select alternative gasket materials where needed.

If you are in need of any additional information, please call me at (313) 246-6106.

Sincerely,

D. P. Thiel, CIH
Ecology Services Coordinator

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

BASF Corporation **BASF**

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 401 235 660

July 3, 1990

Mr. Dowe Parsons
Michigan Department of Natural Resources
Environmental Response Division
P.O. Box 30028
Lansing, MI 48909

Dear Mr. Parsons:

On June 28, 1990, this facility experienced a release of propylene oxide (CAS #75-56-9) which exceeded the CERCLA and SARA reportable quantities for this substance. BASF is hereby submitting the attached report on the incident as required by regulations promulgated under the authority of Michigan Act 245. The MDNR's Lansing Environmental Response Division office was notified promptly about the incident by telephone during the afternoon of June 28, 1990.

If you should have any additional questions regarding this incident please contact me at 246-6209.

Yours very truly,

D. P. Thiel

D. P. Thiel, CIH
Ecology Services Coordinator
BASF Corporation

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 401 235 665

July 3, 1990

Mr. Mark Sparks
LEPC Chairperson
Title III Local Emergency Planning Commission
10250 Middlebelt Road
Detroit, MI 48242

Dear Mr. Sparks:

On June 28, 1990, this facility experienced a release of an extremely hazardous substance requiring notification under Section 304 of the Emergency Planning and Right-to-Know Act. Verbal notification was provided to the MDNR's Lansing Environmental Response Division office (Operator #4, Margo) and Mr. Grimes of the National Response Center on June 28, 1990 at approximately 4:55 p.m. This letter serves as the written follow-up notification required under 40 CFR 355.40(b)(3).

Incident Details

Chemical Name/CAS Number: Propylene Oxide / 75-56-9
Quantity Released: ~1,000 lbs.
Time and Duration of Release: 1600-1615
Released to What Environmental Medium: Primarily air (vapor release) but also minor (<10 lbs.) release to surface water (Detroit River).
Environmental Conditions: ESE winds at approximately 3 MPH, Temperature 22°C.
Anticipated Acute or Chronic Health Risks: None
Medical Attention Requirements: Not applicable

Cause of Incident: A garloc-type gasket failed between the No. 8 Reactor vent valve and Reactor nozzle. This resulted in a PO vapor release to the atmosphere. At the time of the incident, the No. 8 Reactor was in oxide addition with 47,000 pounds of the 57,000 pound propylene oxide addition in the reactor. The reactor was at operating conditions of 257°F. and 75 PSI when the leak in the vapor space developed.

Immediate Corrective Action Taken: The oxide additions to all reactors were shut down and the deluge system was activated to reduce chances of developing flammable vapor concentrations at ground level. The No. 8 Reactor was vented to atmospheric through the roof vent. The remainder of the PO in the reactor was evacuated to the oxide scrubber.

Preventive Action Plan: Several gaskets were replaced on the top of the No. 8 Reactor and the batch was completed. Gasket materials in EO and PO service are being checked and will be replaced with Teflon wound spirotallic gaskets wherever possible. Management personnel will review difficult to seal services and modify piping or select alternative gasket materials where needed.

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

If you are in need of any additional information, please call me at (313) 246-6106.

Sincerely,

D. P. Thiel, CIH
Ecology Services Coordinator

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been issued which require that all owners, managers, or operators of vessels, oil storage, or on-land facilities shall notify the Water Resources Commission or his authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date: 7/3/90

Company Name: BASF Corporation

Location of Loss (Be Specific): Polymers Plant #8 Reactor System

Material Lost: Propylene Oxide

Amount: ~ 1,000 pounds

Name of Surface Water Involved: Not Applicable

Date Loss Was Discovered: 6/28/90

Time of Discovery: 4:00 p.m.

Name of Department of Natural Resources Representative Contacted: Operator #4 (Margo)

Telephoned or Telegraphed by Whom: H. Dale Roush

Time: 4:50 p.m.

Cause of Loss (Include Type of Equipment and Other Details)

A garloc-type gasket failed between the No. 8 Reactor vent valve and Reactor nozzle. This resulted in a PO vapor release to the atmosphere. At the time of the incident, #8 Reactor was in oxide addition with 47,000 pounds of the 57,000 pound propylene oxide addition in the reactor. Reactor was at operating conditions of 257° and 75 PSI when the leak in the vapor space developed.

Nature of Loss (Include Complete Description of Damage)

Incident resulted in a loss of ~ 1,000 pounds of propylene oxide. There was no additional loss of property or known adverse human health or environmental effects as a result of this release.

Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.)

IMMEDIATE RESPONSE ACTIVITIES:

The oxide additions to all reactors were shut down then the deluge was activated to reduce chances of developing flammable vapor concentrations at ground level. No. 8 Reactor was vented to atmospheric pressure through the roof vent. The remainder of the PO in the reactor was evacuated to the oxide scrubber.

Several gaskets were replaced on the top of No. 8 Reactor and the batch was completed. Gasket materials in EO and PO service are being checked and will be replaced with Teflon wound spirotallic gaskets wherever possible. Management personnel will review difficult to seal services and modify piping or select alternative gasket materials where needed.

LONG-TERM PREVENTIVE MEASURES:

Site Maintenance personnel will be trained on the proper selection of gaskets for EO and PO service. Flanges will be inspected periodically to ensure that alternative gasket materials are not used.

Company Name: BASF CORPORATION

By (Signature): Doug Thiel
DOUG THIEL

Return this form to: Michigan Department of Natural Resources
Environmental Response Division
Attention: Remedial Action Section
P.O. Box 30028
Lansing, MI 48909
24-Hour Emergency Notification Number
517/373-8481
800/292-4706 (In state)

R4616

BASF Corporation **BASF**

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 401 235 664

July 3, 1990

Mr. Kent Kanagy
Michigan Department of Natural Resources
State Emergency Response Commission
P. O. Box 30028
Lansing, MI 48909

Dear Mr. Kanagy:

On June 28, 1990, this facility experienced a release of an extremely hazardous substance requiring notification under Section 304 of the Emergency Planning and Right-to-Know Act. Verbal notification was provided to the MDNR's Lansing Environmental Response Division office (Operator #4, Margo) and Mr. Grimes of the National Response Center on June 28, 1990 at approximately 4:55 p.m. This letter serves as the written follow-up notification required under 40 CFR 355.40(b)(3).

Incident Details

Chemical Name/CAS Number: Propylene Oxide / 75-56-9
Quantity Released: ~1,000 lbs.
Time and Duration of Release: 1600-1615
Released to What Environmental Medium: Primarily air (vapor release) but also minor (<10 lbs.) release to surface water (Detroit River).
Environmental Conditions: ESE winds at approximately 3 MPH, Temperature 22°C.
Anticipated Acute or Chronic Health Risks: None
Medical Attention Requirements: Not applicable

Cause of Incident: A garloc-type gasket failed between the No. 8 Reactor vent valve and Reactor nozzle. This resulted in a PO vapor release to the atmosphere. At the time of the incident, the No. 8 Reactor was in oxide addition with 47,000 pounds of the 57,000 pound propylene oxide addition in the reactor. The reactor was at operating conditions of 257°F. and 75 PSI when the leak in the vapor space developed.

Immediate Corrective Action Taken: The oxide additions to all reactors were shut down and the deluge system was activated to reduce chances of developing flammable vapor concentrations at ground level. The No. 8 Reactor was vented to atmospheric through the roof vent. The remainder of the PO in the reactor was evacuated to the oxide scrubber.

Preventive Action Plan: Several gaskets were replaced on the top of the No. 8 Reactor and the batch was completed. Gasket materials in EO and PO service are being checked and will be replaced with Teflon wound spirotallic gaskets wherever possible. Management personnel will review difficult to seal services and modify piping or select alternative gasket materials where needed.

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

If you are in need of any additional information, please call me at (313) 246-6106.

Sincerely,

D. P. Thiel, CIH
Ecology Services Coordinator

mh

bc: MBuller
GTDurst
ACBickel
MHEhrlich
DCFigg
HLMcDonald
KPadar
DLVanLewen

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 401 235 627

March 16, 1990

Mr. Daniel R. Helm
Wayne County Public Works Division
740 Central Avenue
Wyandotte, MI 48192

Dear Mr. Helm:

On March 5-9, 1990, this facility experienced a "slug" discharge to the Wayne County Sanitary Sewer System which required oral and written notification to your office. Oral notification was provided to your office on March 15, 1990 at 1:15 p.m. This letter serves as the written, follow-up notification required under the Wayne County Sewer Ordinance, adopted March 20, 1986, Article V, Sections 2.04(c),(d) and 5.08.

Material: Vitamin E
CAS Number: 58-95-7
Date of Discharge: 3/5/90-3/9/90
Amount: 2,200 lbs.
Corrective Action:
The packing on the high pressure pump was leaking into the seal water. The packing was repaired. To prevent recurrence, the cover over the pump seal will be replaced with clear Plexiglas and a sight glass will be installed in the seal water line. The sight glass and the cover will be checked whenever the pump is in operation.

If you are in need of any additional information, please call me at (313) 246-6429.

Sincerely,

Karen Padar

Karen Padar
Ecology Services Engineer

mh

bc: DPThiel

BASF Corporation

BASF

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 164 348 692

November 30, 1989

Ms. Vicky Hutchinson
Michigan Department of Natural Resources
Waste Management Division
505 W. Main Street
Northville, MI 48167

Dear Ms. Hutchinson:

On November 12 and 13, 1989, this facility experienced two minor spills of acrylonitrile (CAS # 107-13-1) which is on Michigan's Critical Materials Register. BASF is hereby submitting reports on the incidents as required by regulations promulgated under the authority of Michigan Act 245. As you know, your office was notified promptly about the incidents by telephone during the afternoon of November 13, 1989.

If you should have any additional questions regarding these incidents, please contact me at 246-6209.

Yours truly,

Douglas P. Thiel

D. P. Thiel
Ecology Services Coordinator
BASF Corporation

mh
attachments

bc: CWAxce
ACBickel
DCFigg
HDRoush
DLVanLewen

STATE OF MICHIGAN

DEPARTMENT OF NATURAL RESOURCES

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been issued which require that all owners, managers, or operators of vessels, oil storage, or on-land facilities shall notify the Water Resources Commission or his authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date: 11/30/89

Company Name: BASF Corporation, Wyandotte, MI 48192

Location of Loss (Be Specific): Head gasket leak on new acrylonitrile (AN) bulk unloading pump located on cement pad in the Polymers Plant.

Material Lost: Acrylonitrile

Amount: <1 Pint

Name of Surface Water Involved: N/A

Date Loss Was Discovered: 11/13/89

Time of Discovery: 11:30 a.m.

Name of Department of Natural Resources Representative Contacted: Waste Management Division, Ms. Vicky Hutchinson

Telephoned or Telegraphed by Whom: Mr. Douglas Thiel

Time: ~ 3:30 p.m.

Cause of Loss (Include Type of Equipment and Other Details): Engineering and operations personnel failed to realize the need for a pressure relief line between two normally closed block valves in new AN bulk unloading system. As a result thermal expansion of AN liquid trapped between the two block valves over-pressurized the transfer line and pump causing the head gasket to leak.

Nature of Loss (Include Complete Description of Damage): The spilled AN quickly vaporized due to AN's high vapor pressure and was rapidly dispersed by 5-10 mph winds at the time of the incident. The spill area was treated with aqueous sodium bisulfite solution as an added precaution. There was no contamination of the soil or surface waters of the State.

Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.):

1. A pressure relief line was installed at the discharge side of the AN transfer pump to allow possible pressure buildup to vent back to the AN storage tank.
2. Reviewed entire AN bulk storage and handling system to uncover other possible over-pressurization areas and take corrective action as required.
3. Install additional AN vapor monitoring sensors in the vicinity of the AN storage and unloading area. Installation target date - March, 1990.

Company Name: BASF Corporation, Wyandotte Site

By (Signature):

Return this form to: **Michigan Department of Natural Resources**
Environmental Response Division
Attention: Remedial Action Section
P.O. Box 30028
Lansing, MI 48909
24-Hour Emergency Notification Number
517/373-8481
800/292-4706 (In state)

R4616

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

REPORT OF OIL, SALT, OR POLLUTING MATERIAL LOSSES

Pursuant to the provisions of Act 245 of the Public Acts of Michigan 1929 as amended, regulations have been issued which require that all owners, managers, or operators of vessels, oil storage, or on-land facilities shall notify the Water Resources Commission or his authorized representative of oil, salt, and polluting material losses. This notification shall be made promptly by telephone or telegraph, giving briefly the particulars, and by mail, giving a detailed account of events and conditions.

Date: 11/30/89

Company Name: BASF Corporation, Wyandotte, MI 48192

Location of Loss (Be Specific): A leak developed in a gasket on a sight glass on the acrylonitrile (AN) bulk unloading system located on a cement pad in the Polymers Plant.

Material Lost: Acrylonitrile

Amount: < 1 Ounce

Name of Surface Water Involved: N/A

Date Loss Was Discovered: 11/12/89

Time of Discovery: 2:00 p.m.

Name of Department of Natural Resources Representative Contacted: Waste Management Division, Ms. Vicky Hutchinson

Telephoned or Telegraphed by Whom: Mr. Douglas Thiel

Time: ~ 3:30 p.m.

Cause of Loss (Include Type of Equipment and Other Details): Failure of Teflon sight glass gasket.

Nature of Loss (Include Complete Description of Damage): The spilled material immediately vaporized due to AN's high vapor pressure. There was no contamination of the soil or surface water of the State.

Additional Comments (Include Method of Control, Plans for Prevention of Recurrence, etc.)

1. The sight glass has been permanently removed from the AN bulk unloading transfer line.

Company Name: BASF Corporation, Wyandotte Site

By (Signature): Doug Thiel

Return this form to: **Michigan Department of Natural Resources**
Environmental Response Division
Attention: Remedial Action Section
P.O. Box 30028
Lansing, MI 48909
24-Hour Emergency Notification Number
517/373-8481
800/292-4706 (In state)

R4616

BASF Corporation
Chemicals Division

BASF

CERTIFIED MAIL, RETURN
RECEIPT REQUESTED
P-596 485 231

September 10, 1987

(517) 373-1947

Mr. Gary Guenther
Chief Environmental Response Division
Michigan Department of Natural Resources
Stevens T. Mason Building
530 W. Allegan
Lansing, MI 30028

Dear Mr. Guenther:

The enclosed report describes the August 18, 1987 environmental incident which occurred at BASF Corporation's Chemicals Division located in Wyandotte, Michigan. The report includes detailed conditions surrounding the Propylene Oxide loss, immediate safety and environmental actions taken and methods employed to contain and recover the material from the groundwater.

BASF is continuing to implement the most effective remedial action program possible. Please review the Extended Remedial Action Plan and offer any appropriate response before October 15, 1987. BASF's actions to date have been reviewed with Mr. Roy Schrameck and members of his District staff and the support from his group has been appreciated.

Regards,

H. Dale Roush
Manager
Quality Assurance and
Environmental Affairs

mh
Enclosure

cc: R. Schrameck, MDNR, Northville, MI
R. Powers, EPA, Grosse Ile, MI

cc: S. Papadopulos
J. Dragun

CWAxce, FJFederico, DCFigg, KFry, THays

BASF CORPORATION

ENVIRONMENTAL INCIDENT REPORT

The Chemicals Division, BASF Corporation, had a release of propylene oxide (PO) at the Wyandotte Site, Wyandotte, MI. The release was discovered about 6:30 p.m., Tuesday, August 18, 1987. The State of Michigan, the National Response Center, and local officials were notified by telephone. Based on a careful review of plant inventory completed August 21, 1987, we subsequently determined that 54,000 to 58,000 gallons of propylene oxide was lost to the ground from a leaking underground pipeline over a ten (10) to fourteen (14) day period. A second notice which updated the lost quantity was provided to the above agencies on August 21.

As required by our Emergency Response Plan, BASF immediately shut down and secured the production facility and flooded the immediate area with the deluge system and fire hoses. More than 3,000,000 gallons of water was applied over a two-day period. As soon as the safety of personnel and the facilities could be assured, BASF excavated several pits (Figure 1) surrounding the spill site, then began extracting groundwater from the affected areas in order to contain the loss by establishing a clear cone of depression in the groundwater table which centers around ground zero (Figure 2). This immediate containment action is providing a base to effectively measure continued containment and the elimination of adverse environmental impact.

The water from the pits is temporarily held in a lined pond on site where the natural reaction of PO to glycols is occurring. Periodic analysis of the water collected through August 28, 1987 (Table 1) clearly shows the contamination potential is under control and is being quickly reduced to a situation where in-situ biodegradation will naturally and effectively control the situation. Propylene oxide and its water reaction products are soluble and easily biodegraded(1)(2)(5). The water reaction products are non-toxic glycols. BASF has collected numerous groundwater samples from throughout the affected area and has demonstrated that 70-90% of the propylene oxide has been converted to glycols.

During August 20-24, 1987, the combined recovery rate from the pits averaged 100 gpm. Due to the low transmissivity of the underlying soils and the declining recovery rate, the extraction gradually declined to about 45 gpm on August 28. Based on previous investigations of the site, the limited recharge rate will further reduce the average extraction rate to about 10 gpm. Most of the water removed at the higher pumping rates entered the water table because about 3,000,000 gallons of water was applied to the area of the release over a two-day period as a safety measure.

On August 24, 1987, the elevation of the water level in the pits was surveyed. On the same day, the water level was also measured in piezometers existing in the vicinity of the tank area (Figure 1) and the Detroit River. Except for pits 6, 8, and 15 which were dry, these measurements are shown on Figure 2. The configuration of the water table (Figure 2) defined by these measurements indicates that pumpage from the pits created a large cone of depression at the vicinity of the leak area. Groundwater flowing through the leak area is captured by pumping the pits. A groundwater divide (a ridge on the water table) separates groundwater captured by pumpage from groundwater outside the leak area which continues to flow to the north toward Perry Place and to the east toward the Detroit River.

ADDITIONAL ACTIONS TAKEN

Based on the favorable results which were achieved within a short period after the detection of the leak, the following additional steps were taken to further increase the capture of contaminated groundwater:

1. Pits 4, 17 and 18 were deepened to about seventeen feet below land surface (to an elevation of about 567 feet) and completed as extraction wells 4E, 17E, and 18E by installing 18 feet of 12-inch diameter steel pipe with a perforated interval of about 9 feet at the bottom. Around the pipe, each pit was backfilled with crushed stone to the approximate elevation of the non-pumping average water table and with natural materials to the land surface.

2. Pits 1, 3, 5, 7, 9 and 16 were deepened to at least two feet below the water table and completed as piezometers 1P, 3P, 5P, 7P, 9P and 16P by installing 2-inch diameter pipe with the bottom half perforated. The pits were backfilled around the pipe in a manner similar to that of the extraction wells.

3. All other pits were backfilled to grade with natural materials.

4. A monitoring program consisting of the following was initiated:
   a. Weekly water-level measurements in the extraction wells and in the new and existing piezometers (P26, P27, P29, P30, P37 and P38) in the vicinity of the leak area.

   b. Weekly analysis for propylene oxide and propylene glycol(s) from the extraction wells 4E, 17E, and 18E.

INDEPENDENT EXPERTS

The initial corrective actions and the extended Remedial Action Program which follows take into account information and guidance provided by BASF consultants, Dr. James Dragun, Soil Chemist, Stalwart Environmental Sciences and Services, Inc., and S. S. Papadopulos, Groundwater Hydrogeologist of S. S. Papadopulos & Associates.

Dr. Dragun advises:

- Water transport will move the organic contaminants in the same direction as groundwater movement, but at a lesser rate than the actual movement of water[4].

- Propylene oxide and propylene glycol will absorb slightly onto soil because the molecular weight is greater than water[6]. These compounds include hydrophobic fragment that is attracted to hydrophobic surfaces. These chemicals do not have a net negative charge that would lead to repulsation from particle surfaces.

- Soil bacteria will degrade these chemicals fairly quickly if conditions exist to sustain a bacterial population. Satisfactory conditions have been confirmed by BASF as evidenced by determined bacterial counts ranging between 10^3 and 10^6 organisms/mL in the extracted groundwater (3)(6)(7).

- The glycol is an aliphatic alcohol which readily degraded to ketones and to aldehydes and in turn to organic acids[5][8].

- Some soil bacteria have been shown to thrive in propylene oxide concentrations as high as 333 mg/l. Propylene glycols are degraded at concentrations in excess of 4,000mg/l[1][2][8].

S. S. Papadopulos advises:

- A cone of depression has been established in the groundwater table in the area of the loss.

- A cone of depression can be maintained with the operation of wells in the area of the loss by maintaining the elevation of the wells at elevation 573 or less.

EXTENDED REMEDIAL ACTION PROGRAM

Based on the advice of BASF consultants and its knowledge of the site, the Extended Remedial Action Program shall consist of:

- Recompleting extraction wells 4E, 17E and 18E to base clay which is approximately 20 feet below the land surface.

- Maintaining a cone of depression in the water table in the area of the loss by keeping the water elevation in extraction wells 4E, 17E and 18E at 573 feet or less.

- Monitoring water elevations on a weekly basis in new piezometers 1P, 3P, 5P, 7P, 9P, and 16P and existing piezometers P26, P27, P29, P30, P37 and P38. (See Figure 3 for expected elevation of water table).

- Determination of the propylene oxide concentration in the water from the extraction wells on a weekly basis until the concentration is less than 250 mg/l for three consecutive samples. After which the analysis of propylene oxide will be discontinued.

- Determination of the total bacterial count in the water extracted from the wells throughout the Remedial Action period once a week.

- Determination of the propylene glycol in the water from the extraction wells on a weekly basis until the concentration of the glycol is less than 3,000 mg/l for three consecutive samples.

The Remedial Action Program will be complete when the analysis for propylene oxide and propylene glycol are both below their respective criteria levels for three consecutive samples and the bacterial concentration in the water being extracted is more than $1x10^2$ organisms/ml[2][3][4][6][7][8].

If the above criteria does not meet the objectives of the Remedial Action Program in the opinion of the State, BASF must be advised no later than October 15, 1987.

REFERENCES

(1) Hackman, E. 1978, Toxic Organic Chemical Noyes Data Corporation.

(2) EPA Publication 440/1-75/045.

(3) Alexander M. 1981. Biodegradation of Chemicals of Environmental Concern. Science 211:132-138.

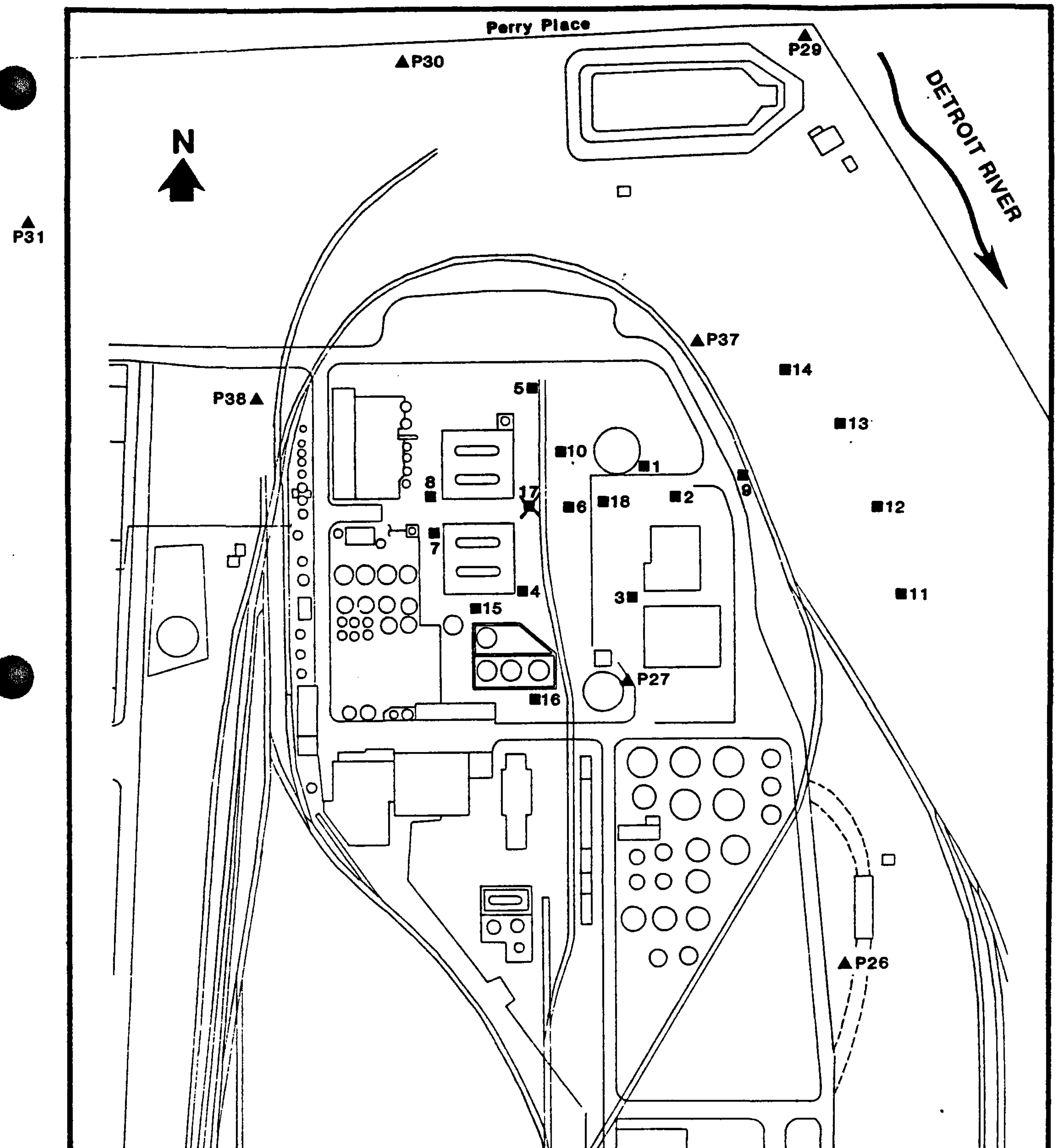
(4) Dragun J. Kuffner AC, and Schneiter RW, 1984. Groundwater Contamination - Part 1: Transport and Transformations of Organic Chemicals. Chemical Engineering 91:65-70.

(5) Geating J. 1981. Literature Study of Biodegradability of Chemicals in Water. Volumes 1 & 2. Franklin Research Center Report to the U.S. Environmental Protection Agency, EPA-600/2-81-175. P882-100843. Cincinnati, OH: U.S. Environmental Protection Agency.

(6) Goring CAI and Hamaker JW (eds) 1972. Organic Chemicals in the Soil Environment. New York: Marcel Dekker.

(7) White A. Handler P. Smith EL, Hill RL, and Lehman IR. 1978. Principles of Biochemistry. New York: McGraw-Hill.

(8) Verschueren, K., 1983. Handbook of Environmental Data on Organic Chemicals, 2nd Edition. New York: Van Nostrand Reinhold Co.



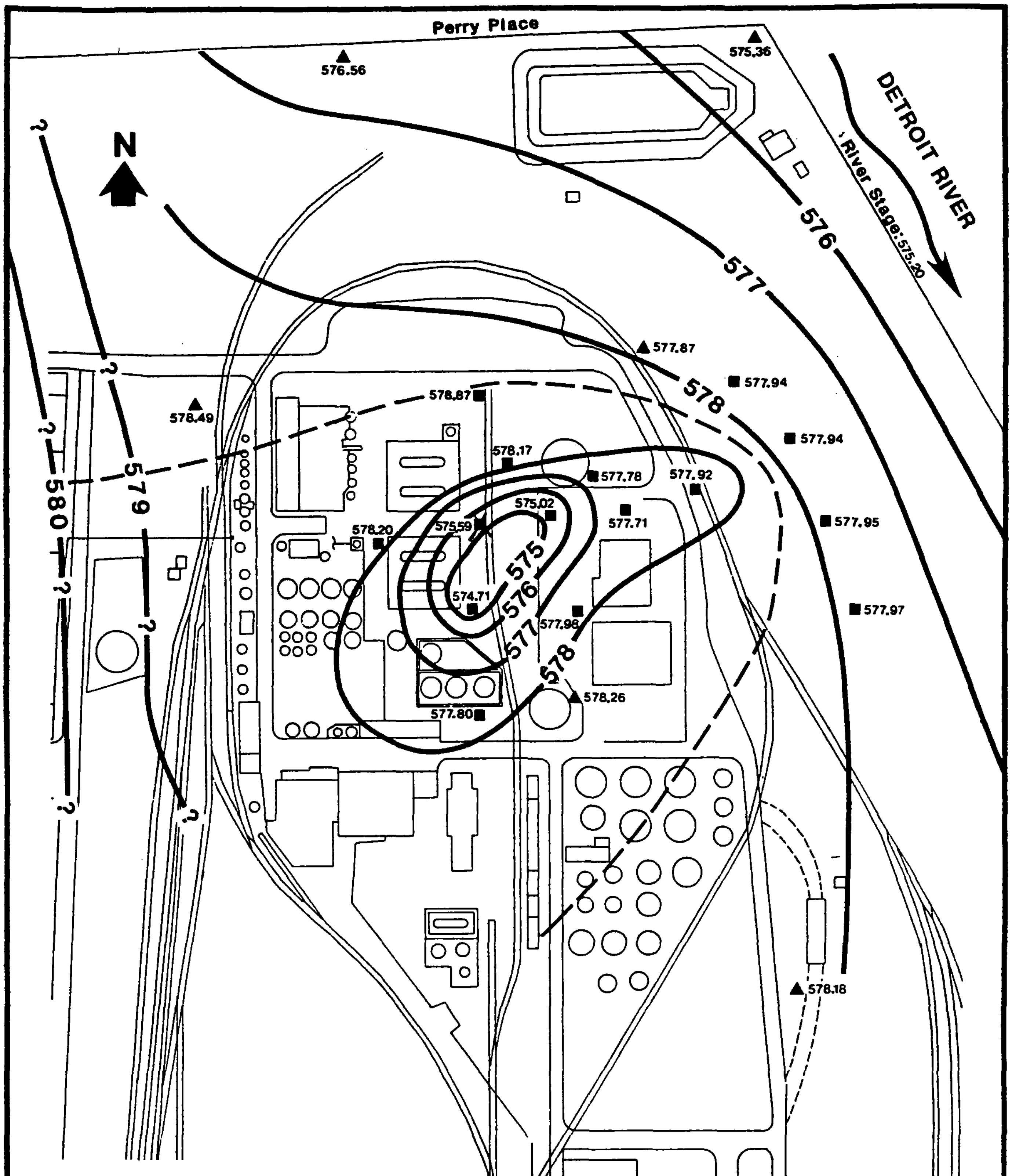
EXPLANATION

3 ■ Location of pit and pit number.

P27 ▲ Existing piezometer.

Scale feet
20 40 60 80 100 200

BASF Corporation Chemicals Division Wyandotte Michigan	LOCATION OF PITS EXCAVATED NEAR THE LEAK AREA	FIGURE 1



EXPLANATION

578.87 ■ ▲ Location of pit (■) or piezometer (▲) and measured water table elevation, in feet above MSL.

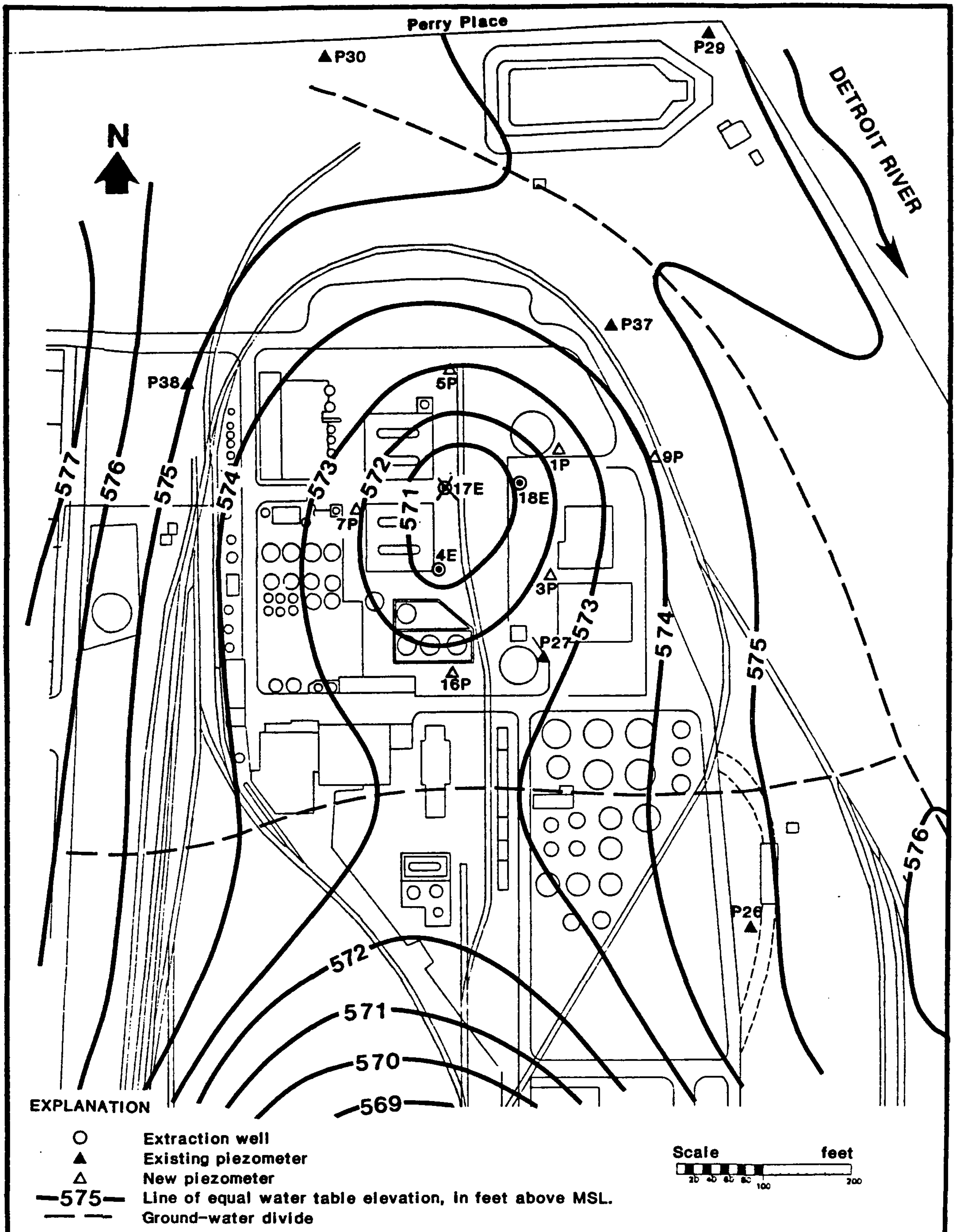
—577— Line of equal water table elevation, in feet above MSL.

— — — Ground-water divide.

Scale feet

20 40 60 80 100 200

BASF Corporation Chemicals Division Wyandotte Michigan	ELEVATION OF WATER TABLE NEAR LEAK AREA – AUGUST 24, 1987	FIGURE 2



BASF Corporation Chemicals Division Wyandotte Michigan	PREDICTED CONFIGURATION OF THE AVERAGE WATER TABLE	FIGURE 3

TABLE 1

GROUNDWATER ANALYSIS

Piezometer	8/28/87 Concentration MG/L			Maximum Concentration of PO
or Well	PO	PG	DPG	8/20-21/87, MG/L
1P	196	342	144	280,000
3P	3	7	2	15,000
5P	104	666	1	506
7P	2	20	6	101
9P	<1	8	2	266
16P	<1	14	4	26,000
P27	<1	ND	<1	<1
P30	<1	ND	<1	<1
P37	<1	2	4	<1
4E	128	92	24	539,000
17E	1,240	10,235	2,232	25,000
18E	145	1,587	184	12,000

Note: Although propylene glycol and dipropylene glycol analyses are not available for August 20-21, 1987, the above results clearly indicate effectiveness of the initial remedial action in reducing the concentrations of propylene oxide and its derivatives in the groundwater under the leak area and the potential for spread of the contamination has been halted.

BASF Corporation
Chemicals Division

BASF

May 28, 1987

Mr. Gordon Guyer, Director
Chairperson, Emergency Planning and
Community Right-to-Know Commission
Department of Natural Resources
Stevens T. Mason Building
P. O. Box 30028
Lansing, MI 48909

Dear Mr. Guyer:

According to the Superfund Amendments and Reauthorization Act of 1986, Section 304 (Emergency Release Reporting), BASF Corporation, Chemicals Division facility located in Wyandotte, Michigan is required to file written reports detailing releases of hazardous substances to Michigan's Emergency Response Commission. This letter will comply with the written reporting requirements of the Act.

The attached BASF telephone log contains pertinent information regarding a reportable emission of ethylene oxide which occurred at the Wyandotte site, May 25, 1987.

Yours very truly,

H. Dale Roush
Manager
Environmental Affairs
Wyandotte

mh
att.

cc: CWAxce, KFry, DSchneider

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

BASF CORPORATION CHEMICALS DIVISION

Report of Release to the Environment

Telephone Log

BCH Person Reporting L. A. Anderson Date and Time 5/25/87 1330

TO: National Response Center ____ Name of Contact P/O Harbour
(1-800-424-8802)

State ____ Name of Contact Operator 15
(1-517-373-7660)

Local ____ Name of Contact ____
( )

Facility or Plant Polyol Plant Date & Time of Release 5/25/87 0800-1100

Release to ____ Air X Water X Ground ____ Other (Describe) ____

Substance Ethylene Oxide Est. of Quantity 100-500# R.Q. 1#

Additional Comments A valve between the Weigh Tank and Hot Well was found to be open. An estimated 100-500# of EO leaked into the Hot Well. Most of it probably vaporized or turned into glycol. There were no personal exposures.

Copies to: Plant Manager
Site General Manager
Site Environmental Manager
Divisional Environmental Affairs

BASF Corporation
Chemicals Division

BASF

April 6, 1987

State of Michigan
Office of the Governor
Lansing, MI 48909

Gentlemen:

According to the Superfund Amendments and Reauthorization Act of 1986, Section 304 (Emergency Release Reporting), BASF Corporation, Chemicals Division facility located in Wyandotte, Michigan is required to file written reports detailing releases of hazardous substances to Michigan's Emergency Response Commission. In the event the State Commission is not designated, the written report is to be submitted to the Governor's office. This letter will comply with the written reporting requirements of the Act.

The attached BASF telephone logs contain pertinent information for reportable events to date which occurred at the Wyandotte site.

Yours very truly,

Dale Roush

H. Dale Roush
Manager
Environmental Affairs
Wyandotte

mh
attachments

CWAxce, KFry, DSchneider

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

BASF CORPORATION CHEMICALS DIVISION

Report of Release to the Environment

Telephone Log

BCH Person Reporting H. D. Roush Date and Time 1025 11/20/86

TO: National Response Center ____ Name of Contact Not required, RQ of 1000#
(1-800-424-8802)

State ____ Name of Contact ____
(1-517-373-7660)

*Local MDNR District Office ____ Name of Contact Leon Vine
(459-4464) Plymouth, MI

Facility or Plant Wyandotte Polyol Date & Time of Release 11/19/86 1900

Release to ____ Air ____ Water ____ Ground X Other (Describe) ____

Spill area sprayed with water as precaution against fire and toxic fumes

Substance Styrene Est. of Quantity 2 gallons R.Q. ____

Additional Comments Reported 2 gallons Styrene loss to ground occurred during removal of unloading hose from tank car. Pressure in hose caused by defective tank car valve. Two persons sprayed with Styrene. One person made precautionary visit to hospital. No injury or adverse health effects resulted from incident.

Copies to: Plant Manager
Site General Manager
Site Environmental Manager
Divisional Environmental Affairs

*Styrene is Michigan Critical Material, thus STATE RQ is any quantity.

BASF CORPORATION CHEMICALS DIVISION

Report of Release to the Environment

Telephone Log

BCH Person Reporting Dale Roush Date & Time 2/15/87 1103

TO: National Response Center X Name of Contact Ensign Smith
(1-800-424-8802)

State ______ Name of Contact ______
(1-517-373-7660)

Local ______ Name of Contact ______
(   )

Facility or Plant Chemical Eng. Research Date & Time of Release Friday, Feb. 13, 1987 1800

Release to X Air ______ Water ______ Ground ______ Other (Describe) ______

Substance Ethylene Oxide Est. of Quantity 7 lbs. R.Q. 1 lb.

Additional Comments While transferring EO to small Research vessel, apparently defective block and bleed valve leaked small quantity of EO to floor of room. The volatile material vaporized into room space and was discharged to the outside atmosphere via room ventilation.

Copies to: Plant Manager - J. Louvar
Works General Manager
Site Environmental Manager
Divisional Environmental Affairs

BASF CORPORATION CHEMICALS DIVISION

Report of Release to the Environment

Telephone Log

BCH Person Reporting Dale Roush Date and Time 3/10/87, 2300

TO: National Response Center ____ Name of Contact Petty Officer Mark O'Brien
(1-800-424-8802)

State Time: 2315 Name of Contact Desi, Operator 15
(1-517-373-7660)

Local ____ Name of Contact ____
(   )

Facility or Plant Wyandotte Polyol Plant Date & Time of Release 3/10/87 2045

Release to ____ Air ____ Water ____ Ground X Other (Describe) ____

Substance Propylene Oxide Est. of Quantity 150-375 lbs. R.Q. 100 lbs.

Additional Comments Propylene Oxide spill occurred from defective valve during unloading from tank car into storage vessel. Emergency Procedure implemented immediately. No safety or health consequences, no property damage. Control regained within minutes.

Copies to: Plant Manager
Site General Manager
Site Environmental Manager
Divisional Environmental Affairs

APPENDIX H

EXHIBIT 1

Inter-Office Memorandum

BASF Wyandotte Corporation BASF

To M. Herbert

Date November 19, 1980

From L. A. Fletcher

Subject Resource Conservation & Recovery Act (RCRA) Test of Polyol Plant Sludge

Copies D. Figg
H. J. Hintz
D. Roush
E. Y. Weissman

Reference

To determine if the polyol pond sludge should be considered a hazardous waste according to RCRA testing procedures, 8 sludge samples were taken from the polyol pond (see Diagram I) with a Ponar dredge sampler on August 28, 1980. Each sample was collected in 1250 mL amber glass bottles with teflon lined caps. Samples were combined in the laboratory as Composite A and Composite B also shown in Diagram I.

Composite A and Composite B were tested for the following characteristics:

Ignitability

A Pensky-Martens Closed Cup Tester was used according to the test method specified in ASTM Standard D-93-79.

Corrosivity

A Leeds & Northrup pH meter was used to determine the pH of the composite samples as specified in "Methods for Analysis of Water and Wastes" EPA 60014-79-020, March 1979.

Toxicity

Millipore's Hazardous Waste Filtration System was used to perform the Extraction Procedure (EP) Toxicity Test according to the May 19, 1980, Federal Register and/or the Millipore Technical Service Brief TS049. The extracts were analyzed for the metals and organics listed in Table I. The extracts were also screened for base-neutral, acid and pesticide Priority Pollutants.

Subject: Resource Conservation & Recovery Act (RCRA)
Test of Polyol Plant Sludge

Test results are shown below:

	Results	
Test	Composite A	Composite B
Ignitability	Flashpoint > 60 C	Flashpoint >60 C
Corrosivity	pH 6.9	pH 7.2
Toxicity	No contaminants detected greater than concentration in Table I	No contaminants detected greater than concentration in Table I
Priority Pollutant Screening	None detected	None detected
Other Compounds TMSN	1600 ppb	24000 ppb

If you have any questions concerning the analytical methods or results, please call.

Liona A. Fletcher

L. A. Fletcher

jp

Attachments

POLYOL POND

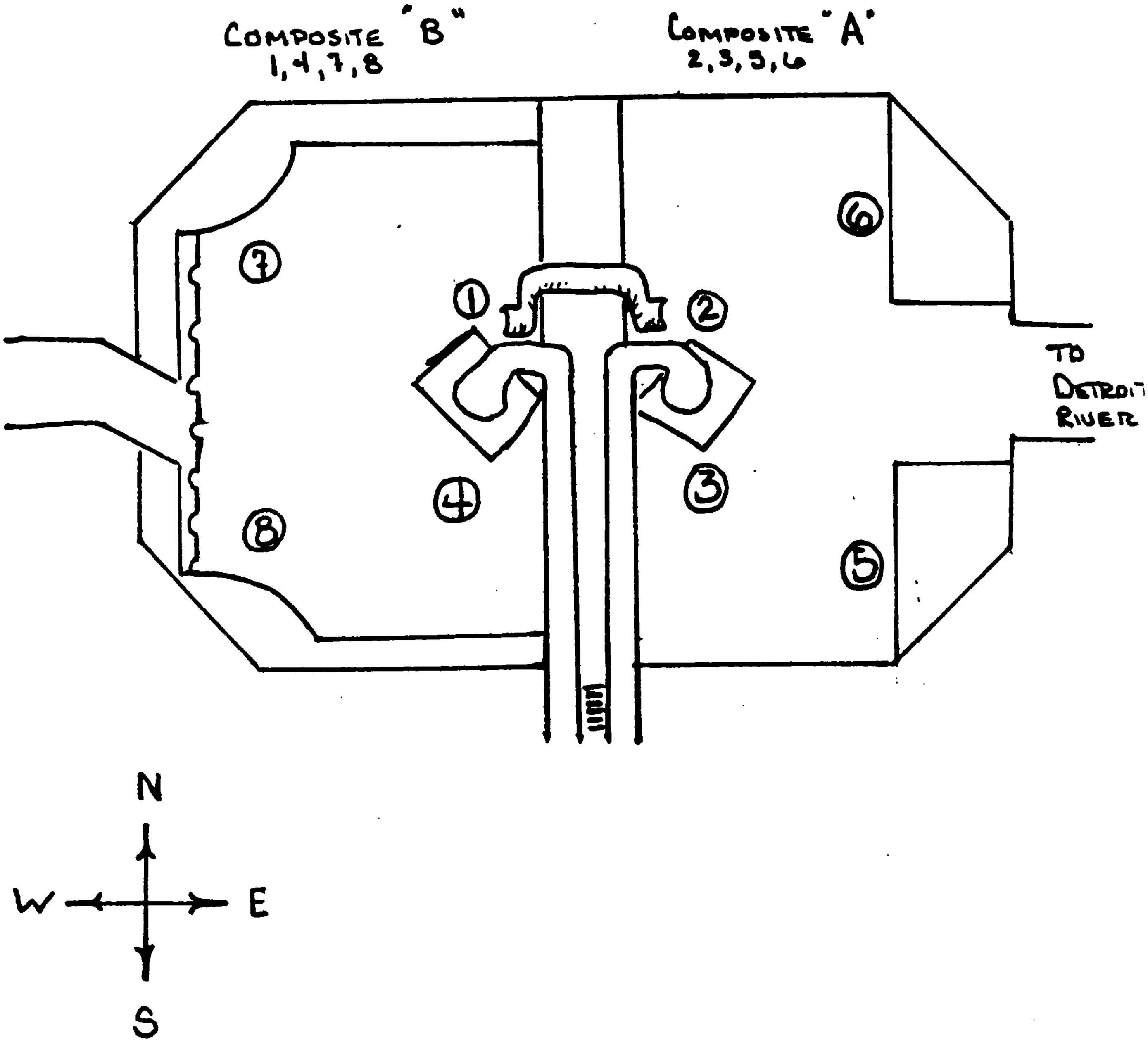


DIAGRAM 1

APPENDIX H

EXHIBIT 2

TABLE I

Contaminants	Max. Concentration (mg/l)
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0
Endrin (1,2,3,4,10,10-Hexachloro-1 7-epoxy-1,4,4a,5,6,7,8,8a octahydro-1 4-endo,endo-5, 8-dimethanonaphthalene	0.02
Lindane 91,2,3,4,5,6-Hexachlorocyclohexane, gamma isomer	0.4
Merhoxychlor(1,1,1-Trichloro-2,2-bis (p-methoxyphenyl) ethane)	10.0
Toxaphene ($C_{10}H_{10}Cl_8$, Technical Chlorinated camphene, 67-69 percent chlorine)	0.5
2,4-D (2,4-Dichlorophenoxyacetic acid)	10.0
2,4,5-TP (Silvex) (2,4,5-Trichlorophenoxypropionic acid)	1.0

GENERATOR'S WASTE MATERIAL PROFILE SHEET

A. GENERAL INFORMATION

GENERATOR NAME: BASF CORPORATION
GENERATOR ADDRESS: 1609 BIDDLE AVE
WYANDOTTE, MI 48192
GENERATOR USEPA I.D. NO.: MID064197742
TECHNICAL CONTACT: ADAM C. BICKEL
PHONE NO.: 246-6836
TRANSPORTER NAME: VAC-ALL SERVICES
TRANSPORTER ADDRESS: 29850 EUREKA
ROMULUS, MI
TRANSPORTER USEPA I.D. NO.: MID065596059
CONTACT PERSON:
PHONE NO.: 729-5510
CLIENT:
BILLING ADDRESS:
CONTACT PERSON:
PHONE NO.:
P.O. NO.:

B. GENERAL DESCRIPTION OF WASTE AND GENERATING PROCESS

WEST POND SETTLING BASIN SEDIMENTS

ANTICIPATED VOLUME
GALLONS ~100 CUBIC YARDS

METHOD OF SHIPMENT:
☒ BULK LIQUID ☒ BULK SOLID ☐ DRUM

FREQUENCY OF SHIPMENT:
☒ ONE TIME ☐ WEEK ☐ MONTH
☐ QUARTER ☐ YEAR ☐ OTHER

C. PHYSICAL CHARACTERISTICS OF WASTE (Include Analytical Test Report)

FREE LIQUIDS: ☒ YES ☐ NO
VOLUME %
SOLIDS: VOLUME % WEIGHT %

pH: ☐ < 2 ☐ 2-4 ☐ 4.1-6.9 ☒ 7 ☐ 7.1-10 ☐ 10.1-12.5 ☐ > 12.5 ☐ N/A ☐ EXACT

FLASH POINT: ☐ < 70°F ☐ 70°F-100°F ☐ 101°F-139°F ☐ 140°F-200°F ☐ > 200°F ☒ NO FLASH ☐ EXACT
☒ CLOSED CUP ☐ OPEN CUP

LAYERS: ☐ MULTILAYERED ☒ BI-LAYERED ☐ SINGLE PHASED

COLOR

ODOR: ☐ NONE ☒ MILD ☐ STRONG ☐ DESCRIBE

PHYSICAL STATE @ 70°F: ☐ SOLID ☒ SEMI-SOLID ☐ LIQUID ☐ POWDER

SPECIFIC GRAVITY: ☐ < .8 ☐ .8-1.0 ☐ 1.1-1.2 ☐ 1.3-1.4 ☐ 1.5-1.7 ☐ > 1.7 ☐ EXACT

D. CHEMICAL COMPOSITION (NO TRADE NAMES)

DIRT, DEBRIS	0.25
POLYOL	0.50
ROCKS	0.25
WATER	0.10

E. METALS

☐ TOTAL (PPM) ☒ EPA EXTRACTION PROCEDURE (mg/l)

ARSENIC (As)	<0.2	SELENIUM (Se)	<0.2
BARIUM (Ba)	<1.0	SILVER (Ag)	<0.05
CADIUM (Cd)	<.05	COPPER (Cu)	<0.5
CHROMIUM (Cr)	<0.5	NICKEL (Ni)	
MERCURY (Hg)	<0.01	ZINC (Zn)	<0.5
LEAD (Pb)	<0.5	THALLIUM (Tl)	
CHROMIUM-HEX (Cr+6)			
CYANIDES		PCBs	
SULFIDES		PHENOLICS	

F. ORGANIC INFORMATION

BOD-5 TOC
TSS

NAME ALL KNOWN ORGANIC CONSTITUENTS LISTED BY THE U.S.E.P.A. AS PRIORITY POLLUTANTS WHICH ARE CONTAINED IN THE WASTE

COMMENTS

POLYOL MSDS ATTACHED

G. CERTIFICATION

I hereby certify that all information submitted in this and all attached documents is complete and accurate, that all known or suspected hazards have been disclosed, and that this material is considered non-hazardous according to U.S. EPA and MDNR regulations.

GENERATOR'S SIGNATURE: Adam C Bickel
TITLE: WASTE COORDINATOR
DATE: 05/25/89

WAYNE DISPOSAL, INC.
P.O. Box 5... • Dearborn MI 48126
MID048090633

MID000724831

GENERATOR WASTE CHARACTERIZATION REPORT (Separate report required for each waste stream)

... U.S. Postal Service ... Wayne or Michigan Disposal, Inc.

GENERATOR GENERAL INFORMATION

MID064197742
BASF CORPORATION
WYANDOTTE POLYOL PLANT
1609 BIDDLE AVE
WYANDOTTE, MI 48192
ADAM BICKEL
(313) 246-6836

Business / Mailing / Broker Information
(if different from facility information)
Company Name
Address
City, State, Zip
Telephone

Hazardous Waste Answers

MID065586059
VAC-ALL SERVICES
29850 ECORSE RD.
ROMULUS, MI 48174
LOU BLATNIK
729-5510

X

Physical State: BLACK
X
X
80

POND SETTLING BASIN SEDIMENTS

Settling Pond for Polyether Polyol Production Process

N/A
7 8

6/8/89 Pond Settling Basin Sediment

pH ____ to ____

DIRT & DEBRIS	0-25	ARSENIC	<.2 ppm
POLYOL	0-50	BARIUM	<1.0 ppm
ROCKS	0-25	CADMIUM	<.05 ppm
WATER	0-20	CHROMIUM	<.05 ppm
		Mercury	<.01 ppm
		Lead	<.5 ppm

Other Characteristics (check any that apply)
☐ Reactive ☐ Pyrophoric
☐ Explosive ☐ Strong Odor
☐ Shock sensitive ☐ Auto Ignitable
(Explain reason for any of above in the ...)
☐ Cyanide ____ ppm ☐ Sulfide ____
conc
☐ EP Toxic (attach test results) ☐ PCBs ____

... according to US EPA

NON-REGULATED, POND SETTLING BASIN SEDIMENTS
NON HAZARDOUS
X 20 cu Yd

VI Notes & Special Handling Information Minor Const. (cont'd)

Selenium <.2 ppm
Silver <.05 ppm
Copper <.5 ppm
Zinc <.5 ppm

VII WDI / MDI office use only

____ SN ____ SF
____ CC ____ PC ____ AN

100 cu yd / day

... by waste generator ... (not broker)

... that all information on this form is complete and factual (including attached information) and is an accurate representation of the known and suspected hazards ...

Name WILLIAM D. BUCK
Print or Type

William D. Buck
Signature

Title OPERATIONS SUPERVISOR

Date 6/8/89

APPENDIX I

EXHIBIT 1

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

BASF Restricted Document

ANALYTICAL REPORT

PAGINATION : 125282
PROJECT NO. : 5Y0160

PAGINATION	:	125282
DESCRIPTION	:	EXCAVATION SOUTHEAST OF OTTAWA, WYANDOTTE
PROJECT NO.	:	5Y0160
REQUESTOR/ID	:	MARTIN, MICHAEL J / 13283 **Ext:** 6878
COST CENTER	:	20270
COORDINATOR/ID	:	MARTIN, MICHAEL J / 13283 **Ext:** 6878
DATE ENTERED	:	05/04/92
DATE FINISHED	:	07/27/92 8/5/92
COPIES TO	:	ADAM BICKEL

INFORMATION/INSTRUCTIONS

Description	Sample #	Test Required
Excavation Southest of Ottawa & Wyandotte	31489	Full TCLP, IR, Identification, Corrosivity, Ig-nitablity, and Reactivity.

RESULTS

CORROSIVITY T. McGahey
THE PH OF THE TOP AQUEOUS PHASE WAS MEASURED AS 7.45. THE SAMPLE WAS THEN SHAKEN VIGOROUSLY AND THE PH WAS AGAIN MEASURED. THE PH FOR THE SLURRY RANGED FROM 6.40 - 7.45.

FTIR SPECTROSCOPY W. Floutz, L. Barczewski

An IR spectrum for the excavation solids shows mainly inorganic material as a mixture of carbonate and silicate salts. A much lower level organic component is indicated. Acetone extraction of the solids provides an organic fraction with an IR spectrum which is primarily that of a polyether polyol. No indication of hydrocarbons.

X-RAY MICROANALYSIS J.S. Jourdan

EDS analysis of the dried solids showed mostly silicon, calcium, and iron, with lower levels of sodium, magnesium, aluminum, sulfur, chlorine, and potassium.

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

PAGE 2
PAGINATION : 125282
PROJECT NO. : 5Y0160

FLASH POINT J.S. Jourdan

The sludge sample was analyzed for flash point using an ERDCO Closed-Cup (Seta) Flash Point Apparatus. No* flash point below 300°C was detected.

* - Initial measurements suggested a flash point at 80°C due to flame being extinguished when introduced into the chamber. However, no "flash" normally associated with the test was observed. Subsequent tests using distilled water showed that enough water vapor is emitted at 80°C to extinguish the test flame when it is introduced into the sample chamber. Further tests using less sample proved negative for flash point. Tests using dried soil also showed no flash. A sample of the sludge was even tested for ignitability by directing an open flame on it. The sludge dried without burning.

TCLP VOLATILES BY GC/MS - S.C.WALKINSHAW

THIS SAMPLES WAS EXTRACTED ACCORDING TO THE TCLP METHOD AND THEN ANALYZED ACCORDING TO EPA METHOD 625. SAMPLE HAD TO BE DILUTED 10X AND 50X FOR ANALYSIS.

COMPOUND	CONC. (PPB) BLANK	31489 (SLUDGE)
VINYL CHLORIDE	ND	5200
1,1,-DICHLOROETHENE	ND	ND
CHLOROFORM	ND	ND
1,2-DICHLOROETHANE	ND	160*
BENZENE	ND	8100
CARBON TETRACHLORIDE	ND	ND
TRICHLOROETHENE	ND	2000
TETRACHLOROETHENE	ND	ND
CHLOROBENZENE	ND	53000
METHYLETHYL KETONE	ND	ND

DETECTION LIMITS ARE ~5PPB FOR ALL COMPOUNDS EXCEPT MEK WHICH IS ~50PPB. SINCE THE SAMPLE WAS DILUTED, THE DETECTION LIMITS ARE 10X OR 50X THOSE GIVEN.

* = QUANTITATION BASED ON 50X DIL., ALL OTHERS BASED ON 10X DIL.

GC/MS ANALYSIS OF SEMI-VOLATILES - S.C.WALKINSHAW

These samples were extracted using the TCLP procedure and analyzed according to EPA Method 625.

ACIDS:	Conc. (PPM) 31489	BLANK	REG. LEVEL
Total Cresols (o-,m-, & p-)	.075	ND	200*
Pentachlorophenol	ND	ND	100
2,4,5-Trichlorophenol	.075	ND	400
2,4,6-Trichlorophenol	ND	ND	2.0

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POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

SURROGATE RECOVERY	31489(%)	BLANK(%)
2-FLUOROPHENOL	26	35
d5-PHENOL	17	26
2,4,6-TRIBROMOPHENOL	37	49

METHOD STD SPIKE RECOVERY(%):

	31493MSTD	%RECOVERY LIMITS
PENTACHLOROPHENOL	51	14-176

SURROGATE RECOVERY	31493MSTD(%)
2-FLUOROPHENOL	43
d5-PHENOL	30
2,4,6-TRIBROMOPHENOL	54

NOTES:
1. ND = not detected
2. Detection limits are ~5ppb.
3. * = The cresol isomers are reported as total cresol because 2 of the isomers are not resolved. Also the TCLP regulatory levels are given as 200mg/L for each cresol isomer and 200mg/L for total cresol, which implies a limit of 200mg/L for each isomer with the total of the 3 isomers not more than 200mg/L.

	CONC.(PPM)		
	31489	BLANK	REG. LEVEL
BASE/NEUTRALS:			
1,4-DICHLOROBENZENE	.0075	ND	7.5
HEXACHLOROETHANE	ND	ND	3.0
NITROBENZENE	ND	ND	2.0
HEXACHLOROBUTADIENE	ND	ND	0.5
2,4-DINITROTOLUENE	ND	ND	0.13
HEXACHLOROBENZENE	ND	ND	0.13
PYRIDINE	ND	ND	5.0

SURROGATE RECOVERY	31489(%)	BLANK(%)
NITROBENZENE-d5	75	68
2-FLUOROBIPHENYL	83	69
p-TERPHENYL-d14	57	0

METHOD STD SPIKE RECOVERY(%):

	31493MSTD	%RECOVERY LIMITS
BASE/NEUTRALS:		
1,4-DICHLOROBENZENE	63	20-124
2,4-DINITROTOLUENE	61	39-139

SURROGATE RECOVERY	31493MSTD(%)
NITROBENZENE-d5	46
2-FLUOROBIPHENYL	61
p-TERPHENYL-d14	80

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

NOTES:
1. ND = NOT DETECTED
2. Detection Limits are ~ 5ppb.

____Metals Analysis--N. M. Less____

These samples were prepared following the Toxicity Characteristic Leaching Procedure (TCLP), Method 1311. The samples were analyzed for mercury using cold vapor atomic absorption spectroscopy and for all other metals using inductively coupled plasma atomic emission spectroscopy. Values which are less than the method detection limit (MDL) are reported as not detected (ND). Other values which are greater than the MDL but less than the practical quantification limit (PQL) are reported as "< PQL".

	Blk #31489	#31489	MDL	Reg. Limit
Arsenic (ppm)	ND	<0.1	0.03	5.0
Barium (ppm)	ND	<0.5	0.003	100.
Cadmium (ppm)	ND	<0.02	0.003	1.0
Chromium (ppm)	ND	0.09	0.009	5.0
*Copper (ppm)	ND	<0.05	0.003	---
Lead (ppm)	ND	<0.2	0.04	5.0
Mercury (ppm)	ND	ND	0.0004	0.2
*Nickel (ppm)	ND	0.38	0.01	---
Selenium (ppm)	ND	ND	0.05	1.0
Silver (ppm)	ND	****	0.003	5.0
*Zinc (ppm)	<0.05	0.14	0.003	---

*: The values listed for copper, nickel, and zinc are from the analysis of the neat (i.e. undigested) samples. The digested samples were not prepared for the analysis of these metals.

****Note: Sample RS #31489 had high levels of chloride. The recovery for Ag was poor (3%). The sample had white particulate matter dispersed throughout it. Ammonium hydroxide was added to the sample to dissolve any silver chloride present. The particles were not dissolved by the ammonium hydroxide and are most likely silicon dioxide.

REACTIVITY - CANTON ANALYTICAL LAB

As Cyanide	<0.02mg/kg	by EPA Method 9010	Analyzed on 5/11/92 by DM
As Sulfide	<0.1 mg/kg	by EPA Method 9030	Analyzed on 5/12/92 by DM

APPROVAL: Michael J. Martin

CC: 3061

BASF CORPORATION
1609 BIDDLE AVE.
WYANDOTTE, MI 48192
ECOLOGY SERVICES DEPARTMENT
FAX NO.: 313/246-6775

LABORATORY SAMPLE NO.: ____________
BASF SAMPLE NO.: ____________
SAMPLE DESCRIPTION: ____________

→ Black Tarry Substance,

ANALYTICAL RESULTS REQUIRED BY: 5/8/92

CHAIN OF CUSTODY RECORD
LABORATORY ANALYSIS REQUEST

COLLECTORS NAME: Adam Bickel TELEPHONE NO.: (313) 246-6 836

P.O. NUMBER: ____________ RELEASE ORDER NO.: ____________

DATE SAMPLED: 5/1/92 TIME SAMPLED: ________ am/pm

SAMPLING METHOD: GRAB X COMPOSITE ____ OTHER: ____________

SAMPLE DESCRIPTION: ____________

LOCATION OF SAMPLING: PLANT ____________

LOCATION DESCRIPTION EXCAVATION SOUTH EAST OF OTTAWA & WYANDOTTE

PROCESS DESCRIPTION: ____________

FIELD INFORMATION: ____________

CHAIN OF POSSESSION

	SIGNATURE	TITLE	ORGANIZATION OR DEPARTMENT	DATE RECEIVED	DATE RELINQUISHED
1)					
2)					
3)					
4)					
5)					
6)					

(REV.10/90)

APPENDIX I

EXHIBIT 2

CARBOSE SKIMMER PIT (AOC 3) EXCAVATION, 1993

APPENDIX J

Inter–Office Memorandum

BASF Wyandotte Corporation BASF

To	C. W. Axce (4) → HDR	Date	April 16, 1985 Item 2.1
From	B. M. Barkel	Subject	Preliminary Report - PDC SOIL CONTAMINATION @ Wyandotte North Works
Copies		Reference	

This preliminary report will serve to summarize the current status of the project, present the preliminary data on hand and suggest initial interpretations of this data as a guide to planning future work.

I. DRILLING WORK

To date, sixty-seven (67) core holes have been drilled. Twenty one (21) holes were drilled in the first phase of work and forty-six (46) were drilled in Phase II. The drilling activity may be summarized as follows:

Total Core Holes - 67
Holes Sunk to Gray Clay - 43
Area Covered by Drilling Pattern - Approx. 13.75 Acres

II. SAMPLING PROGRAM

To date, 349 core sections have been analyzed for PDC. Each sample analyzed represents a composite of a 3 ft. section of core. Results are reported as parts per million PDC based on the total weight of the sample (solid & liquid). Analysis is by gas chromatograph, using a head space method. The sampling activity may be summarized as follows:

Samples Analyzed - 349
Locations Analyzed - 67
Length of Core represented by Sample - 3 ft.
Composited sample size/core - 20 gms.
Minimum detection limit - 1 ppm as 1,2 PDC
Accuracy of method - ± 10%

Accuracy of analysis is effected by two factors - the volatility of PDC and the difficulty in uniformly compositing a sample containing liquids and various types of solids. Twelve core samples were rechecked for reproducability. In general, second readings were 40-50% lower than original, probably due to loss of volatile PDC during handling for the first sample. It is interesting to note, however, that for the samples which represented the same core hole

II. SAMPLING PROGRAM (Cont'd.)

(2 sections from the same hole for each of 5 holes), the results decrease IN RATIO within $\pm$ 10%. This indicates that volatile loss of PDC is a significant problem during handling and storage and that all results obtained are probably LOWER than true in situ values.

Compositing of liquids, both aqueous phases and free PDC, and solids consisting of stones, ciders, sand, organic deposits and clays is extremely difficult. This factor probably introduces significant error especially in sample containing free PDC and in those having radically different mixed solids.

It must be stressed that all results to date except the first 84 samples, represent PRELIMINARY DATA taken directly from the G.C. and not reviewed or audited. It, therefore, must be considered trend data, subject to review.

III. PRELIMINARY RESULTS

The preliminary results of area contamination based on the data on hand are shown on the attached computer generated contour map. To develop an appropriate scale factor for values ranging from 0-15,000, concentration was converted to a modified log factor - Value. This Value represents 100 log C - 100 which tends to dampen out minor concentration differences. On the plot, the ppm concentrations matching the contour lines have been indicated.

Also attached are contour maps of the top of the gray clay and the thickness of the sand layer over lying the clay for the area investigated. In addition computer generated "spacial maps" of concentration, clay elevation and sand thickness are presented.

Core logs for all holes were prepared and are presented indicating both strata encountered and PDC concentration at various depths for each of the core holes.

IV. DISCUSSION OF RESULTS

Preliminary analysis of the data indicates that the PDC has migrated from the original spillage area through the sand layer which overlays the gray clay. It would appear to be moving "down dip" along the dlay with the highest migrating concentrations in the bottom half of the sand layer. In several locations shallower overlying clay layers were found, but these did not serve as effective confinement for the PDC. This would be expected for two reasons:

IV. <u>DISCUSSION OF RESULTS</u> (Cont'd.)

1. The shallower clay layers were found to be thin and in most cases contained silt and/or sand seams which makes the layer permeable.

2. The high PDC concentrations in the area of original spillage are not capped with the shallow clays. This allows leaching of the PDC to the lower sand bed and thus provides a route <u>under</u> any shallow clays.

Contour maps of concentration and clay elevation indicate a natural confinement of the PDC to the North, East and West which can be utilized for any containment plan.

V. <u>CALCULATION OF PRESENT PDC CONTENT OF AREA</u>

The amount of PDC in the ground was estimated based on the following assumptions:

1. All significant quantities of PDC are located in the bottom 1/2 of the sand layer.

2. Only areas showing $>$100 ppm PDC were considered.

3. The sand was assumed to have a density of 125 lbs./ft.^{3}.

A contour map of PDC concentrations was superimposed on a contour map of sand layer thickness and areas defined which had the same thickness of sands and the same concentration of PDC. A 25' x 25' grid to the same scale as the contour maps was then used to determine the square feet in each area. The pounds of PDC in that area were then calculated by:

$$\text{lbs. PDC} = A \times \frac{t}{2} \times 125\#/\text{ft.}^3 \times \frac{C}{10^6}$$

t = sandbed thickness ft.
C = concentration of PDC

The various areas were then summed.

Approx. PDC content in ground = 358575 lbs.
≈ 179T
@ 1.16 Sp Gr ≈ 37,000 gal.

VI. UTILITY OBSTRUCTIONS IN AREA

Attached is a sketch showing utility obstructions in the involved area which might have an effect on a plan of corrective action.

VII. ADDITIONAL WORK

The following additional work is recommended if consistant with the requirements of the corrective plan.

1. Core drilling south of Alkali Rd. around Core Hole #48 to better define contours in this area.

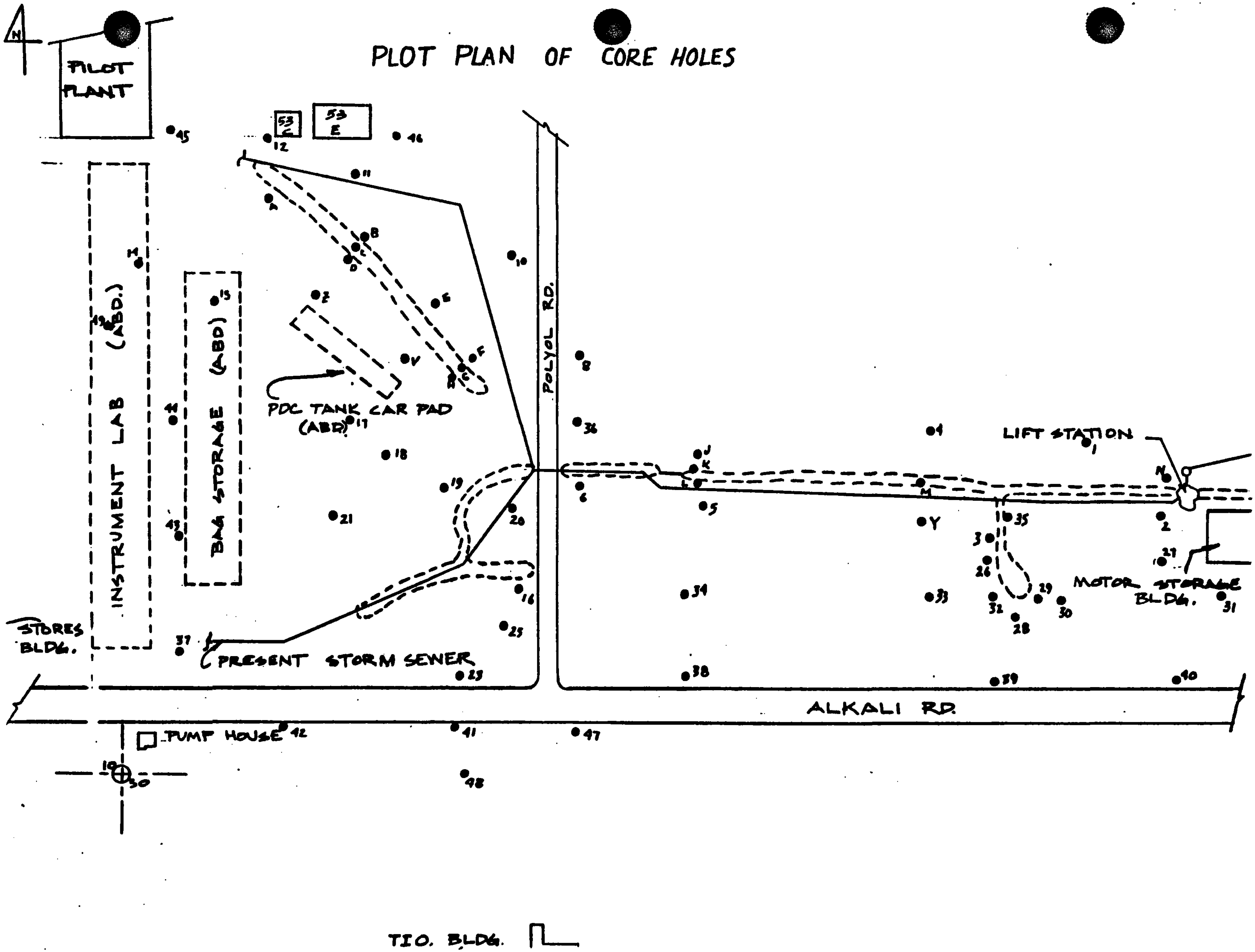
2. Deep core drilling at selected sites to establish the thickness of the gray clay.

It must be stressed again that this status report is based on preliminary data. Any significant changes which develop on receipt of final audited data will be reported as developed.

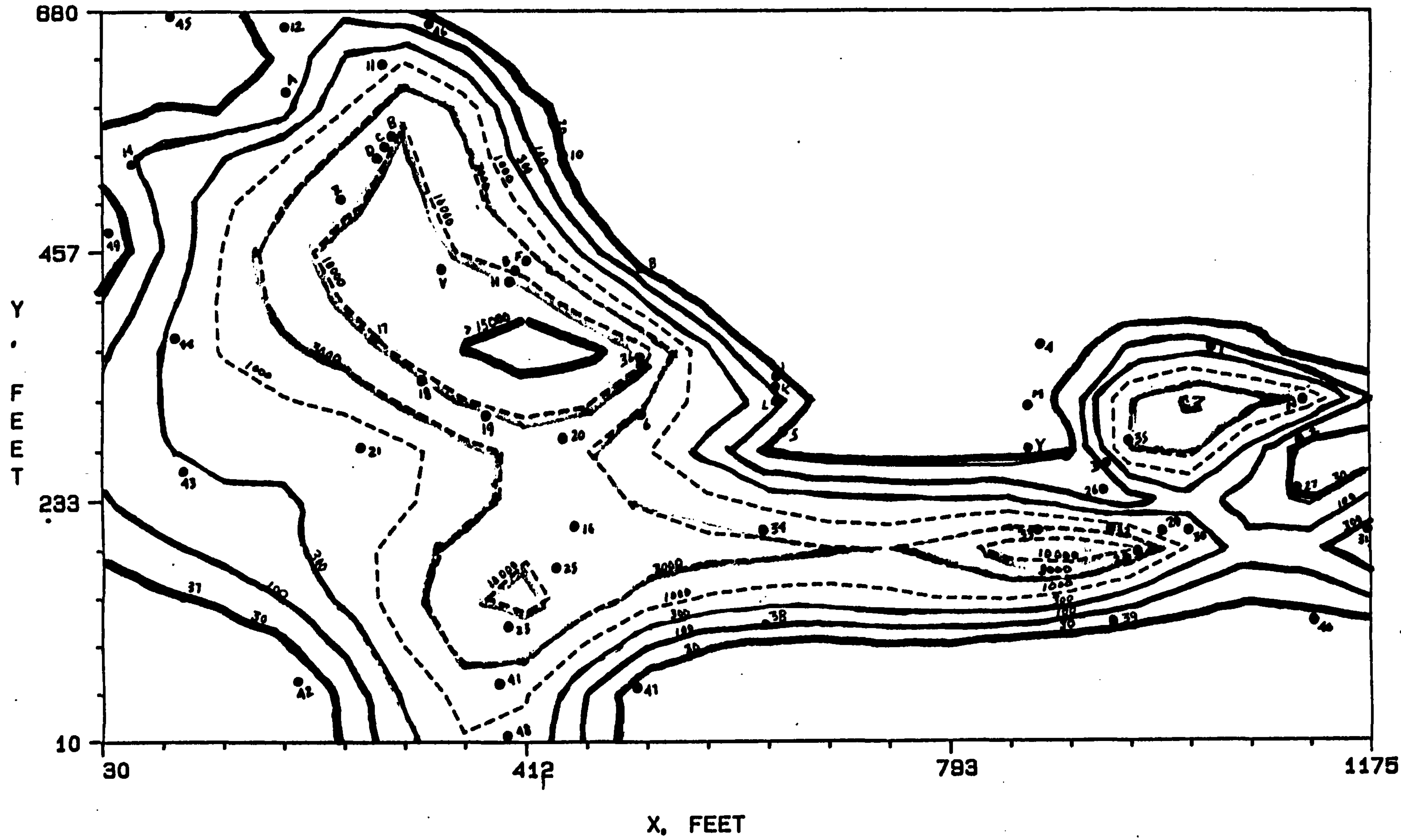
Barry M. Barkel

dr

PLOT PLAN OF CORE HOLES



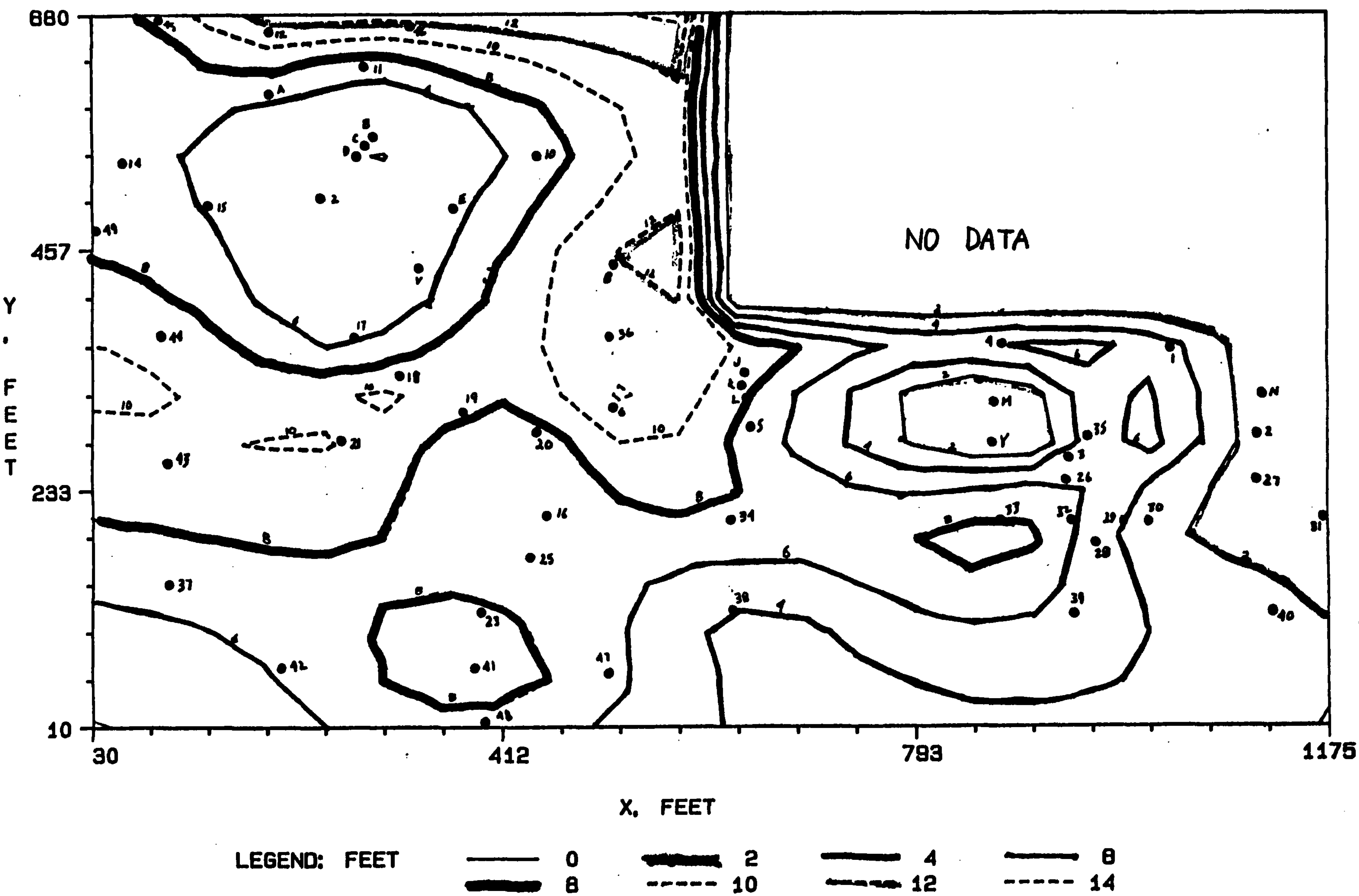
CONCENTRATION



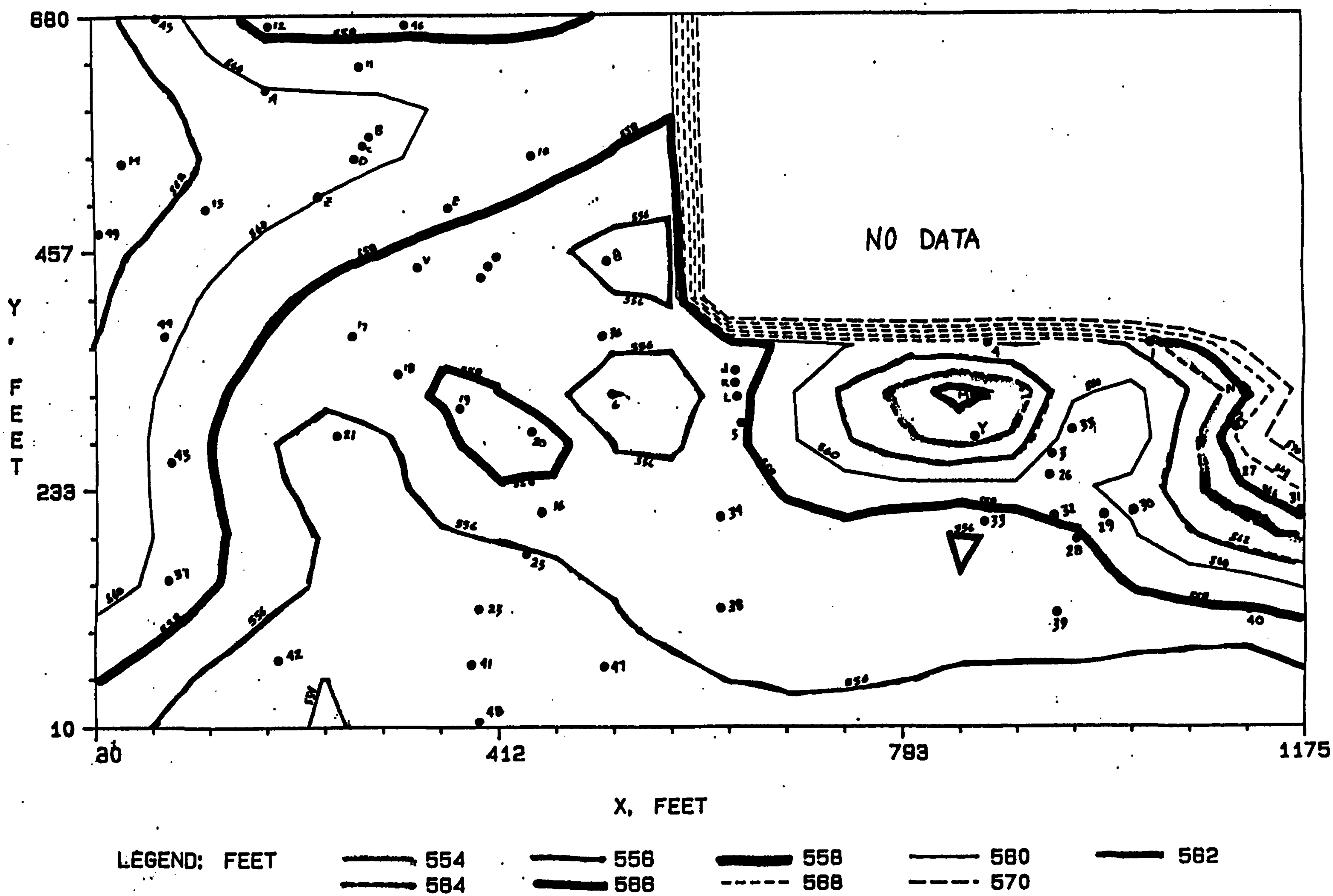
LEGEND: VALUE (MOD. log C)

0 PPM 0	30 PPM 50	100 PPM 100	300 PPM 150
1000 PPM 200	3000 PPM 250	10,000 PPM 300	>15,000 PPM 350

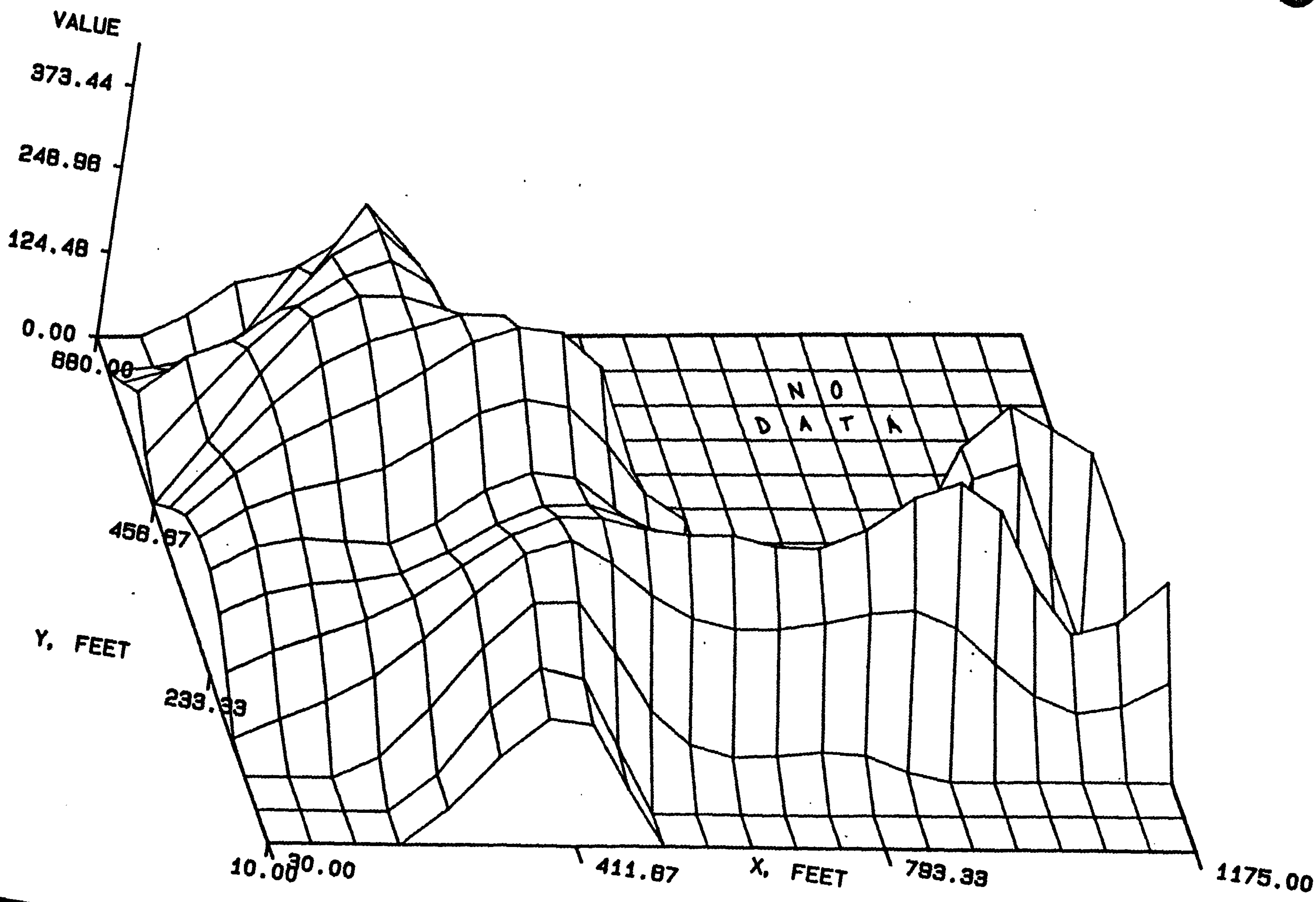
SAND LAYER THICKNESS



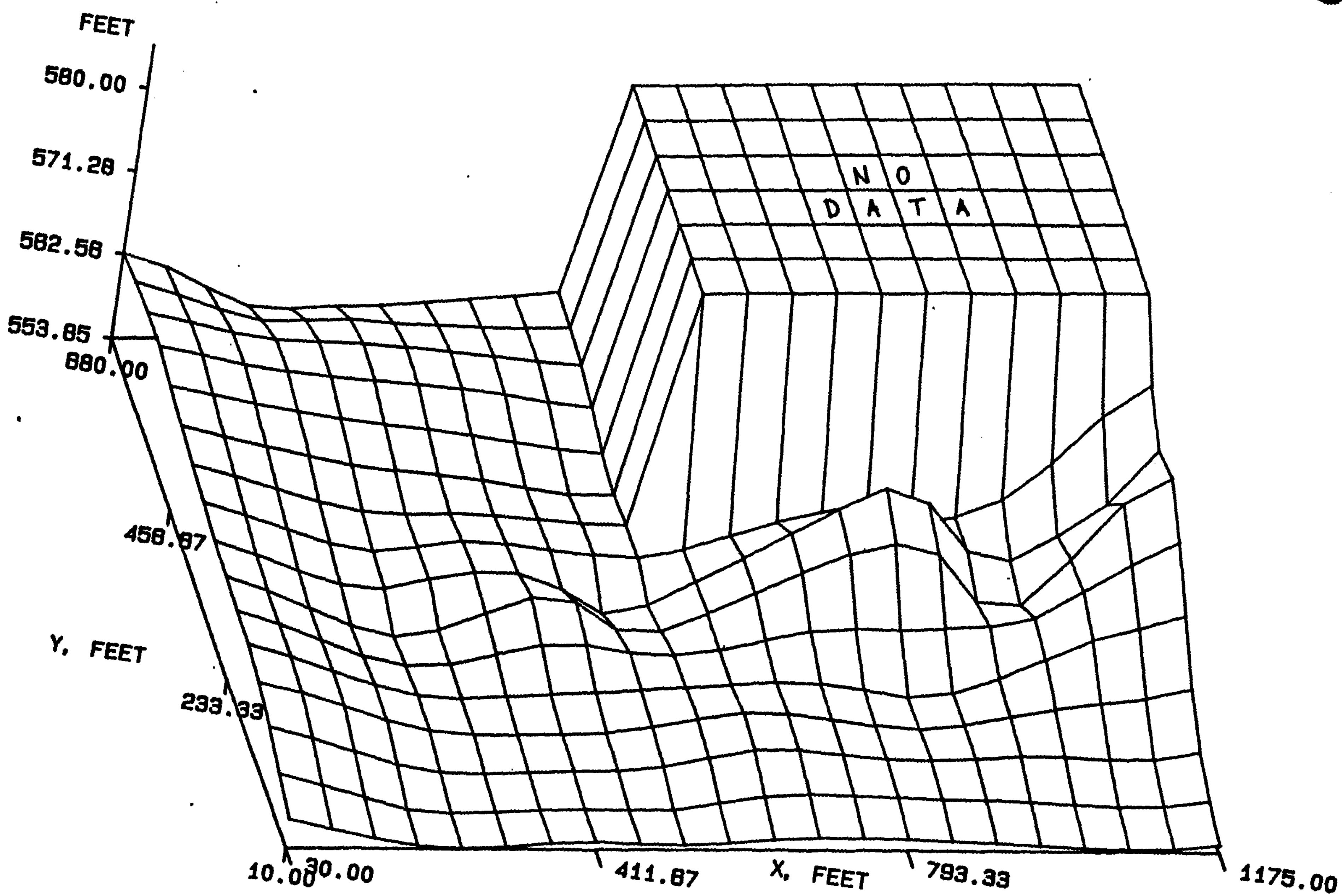
CLAY ELEVATION



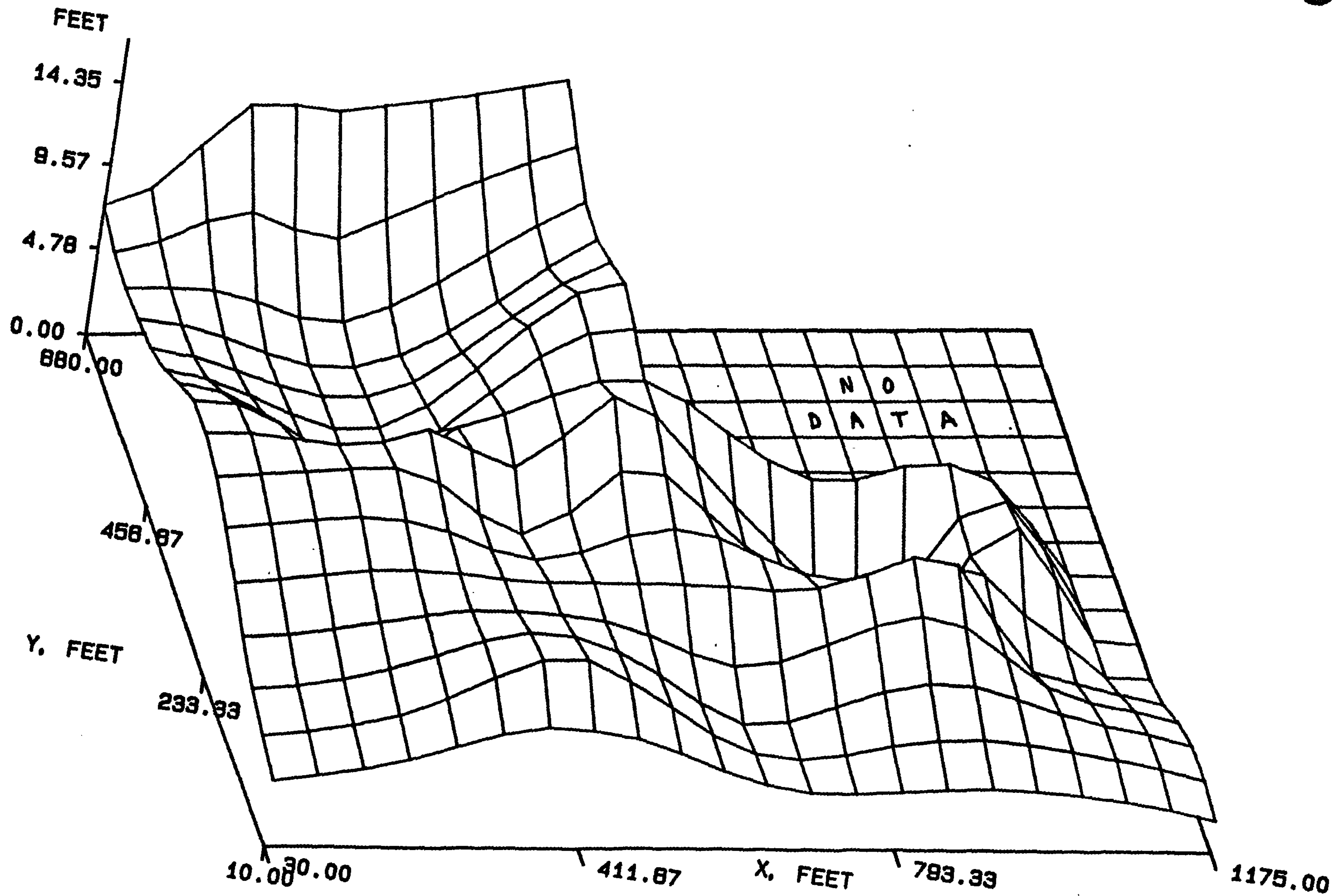
CONCENTRATION



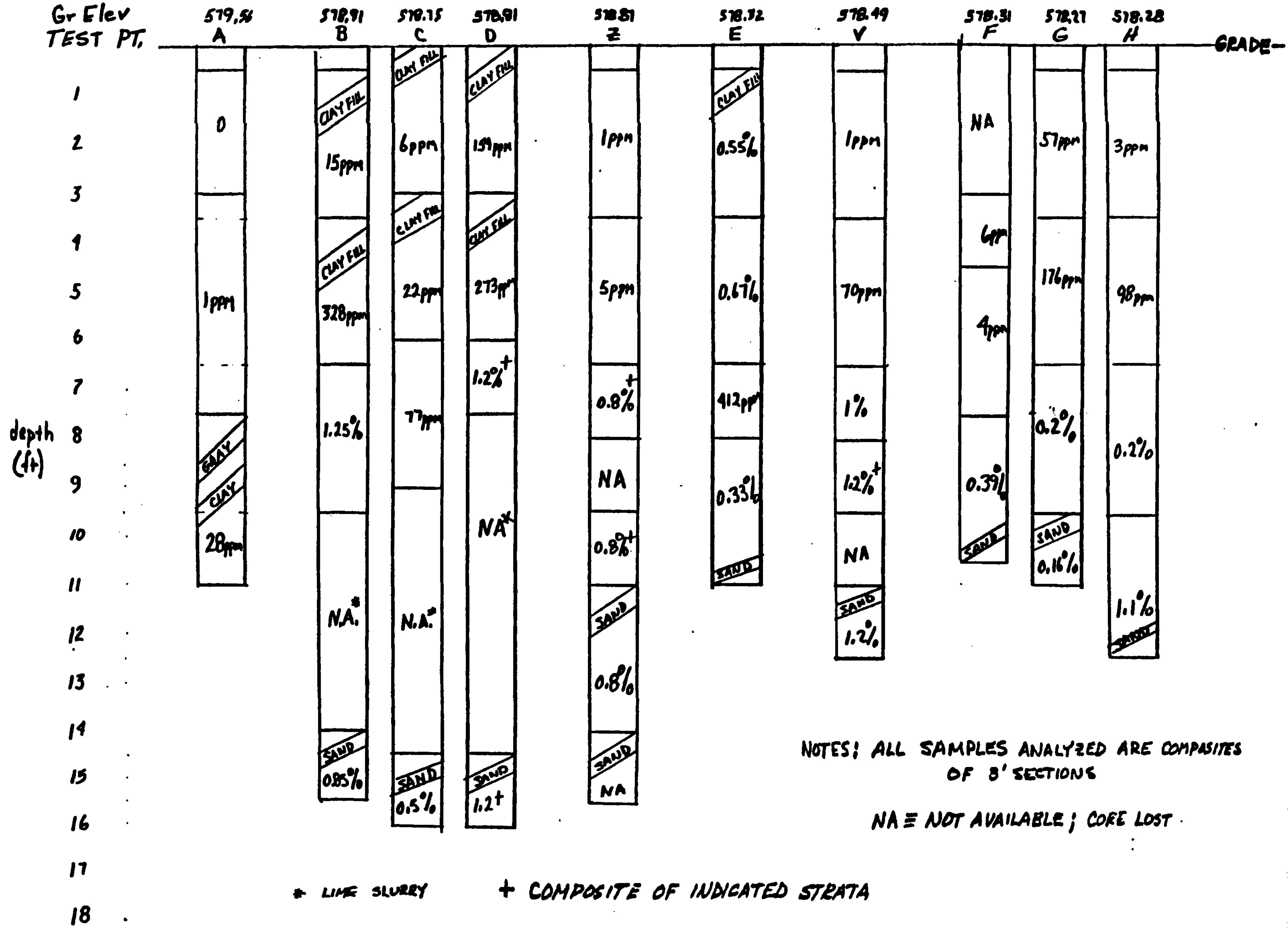
CLAY ELEVATION



SAND LAYER THICKNESS



DEPTH VS PDC CONCENTRATION



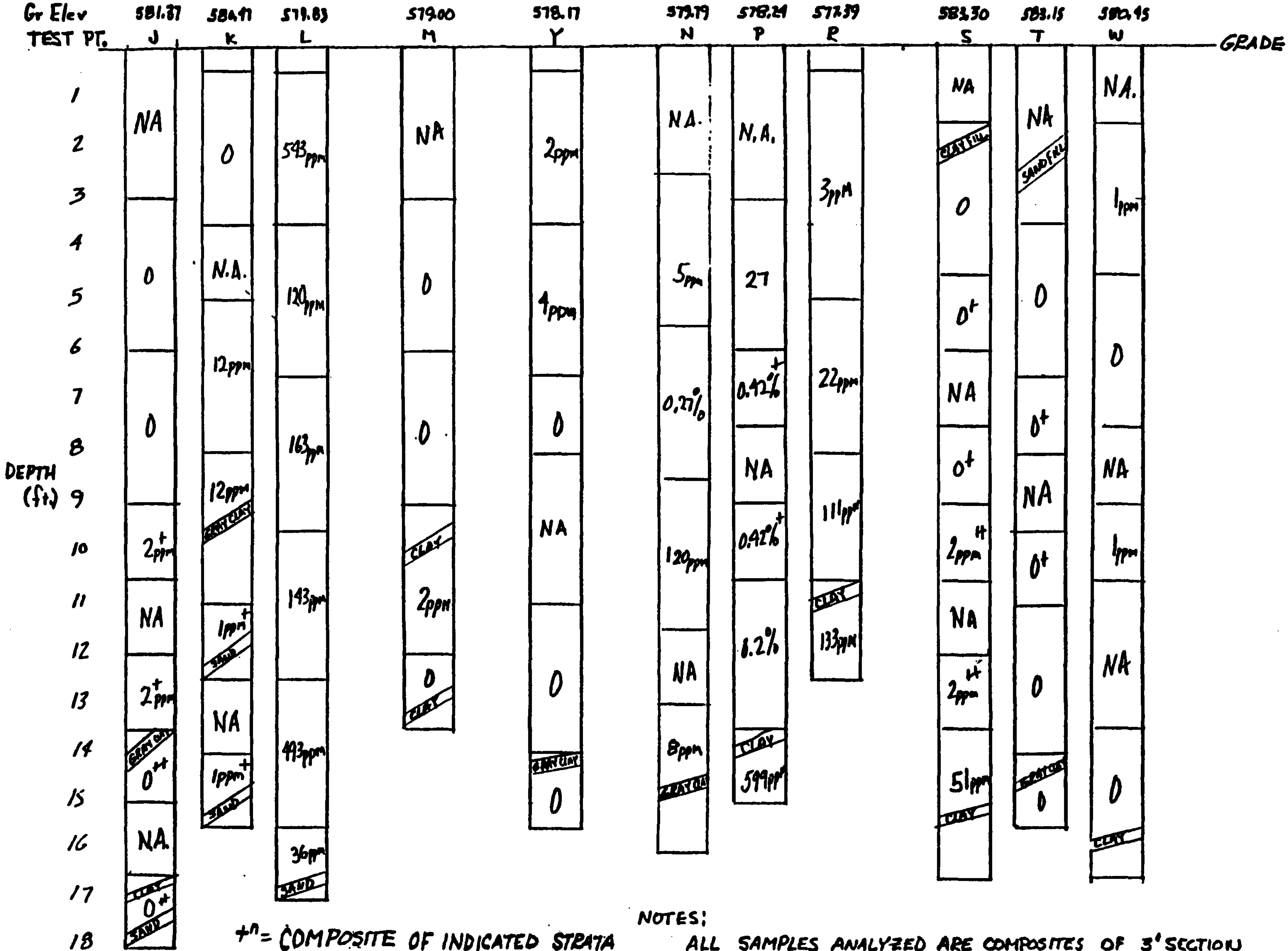
NOTES: ALL SAMPLES ANALYZED ARE COMPOSITES OF 3' SECTIONS

NA ≡ NOT AVAILABLE; CORE LOST

* LIME SLURRY

\+ COMPOSITE OF INDICATED STRATA

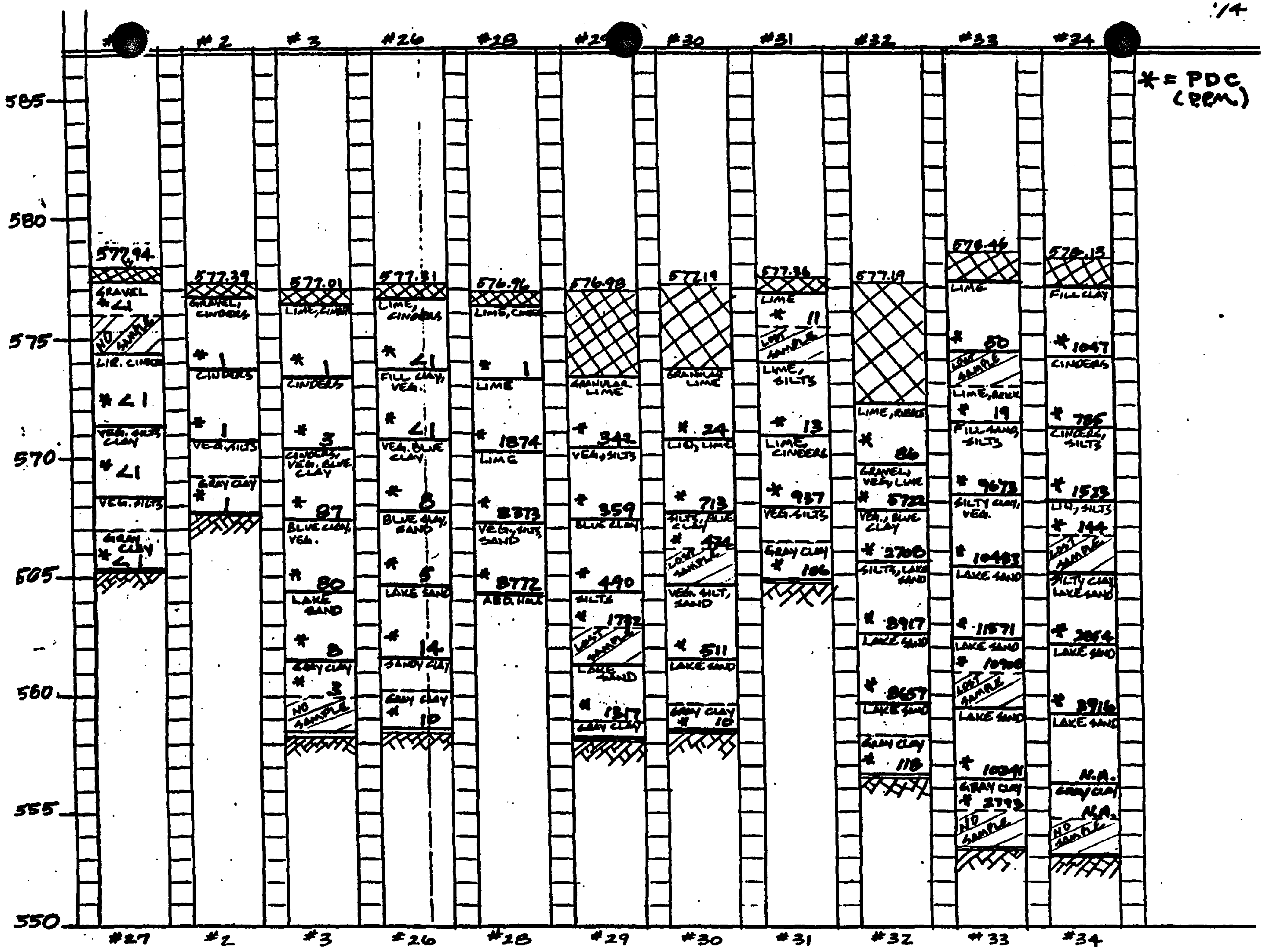
DEPTH VS PDC CENTRATION

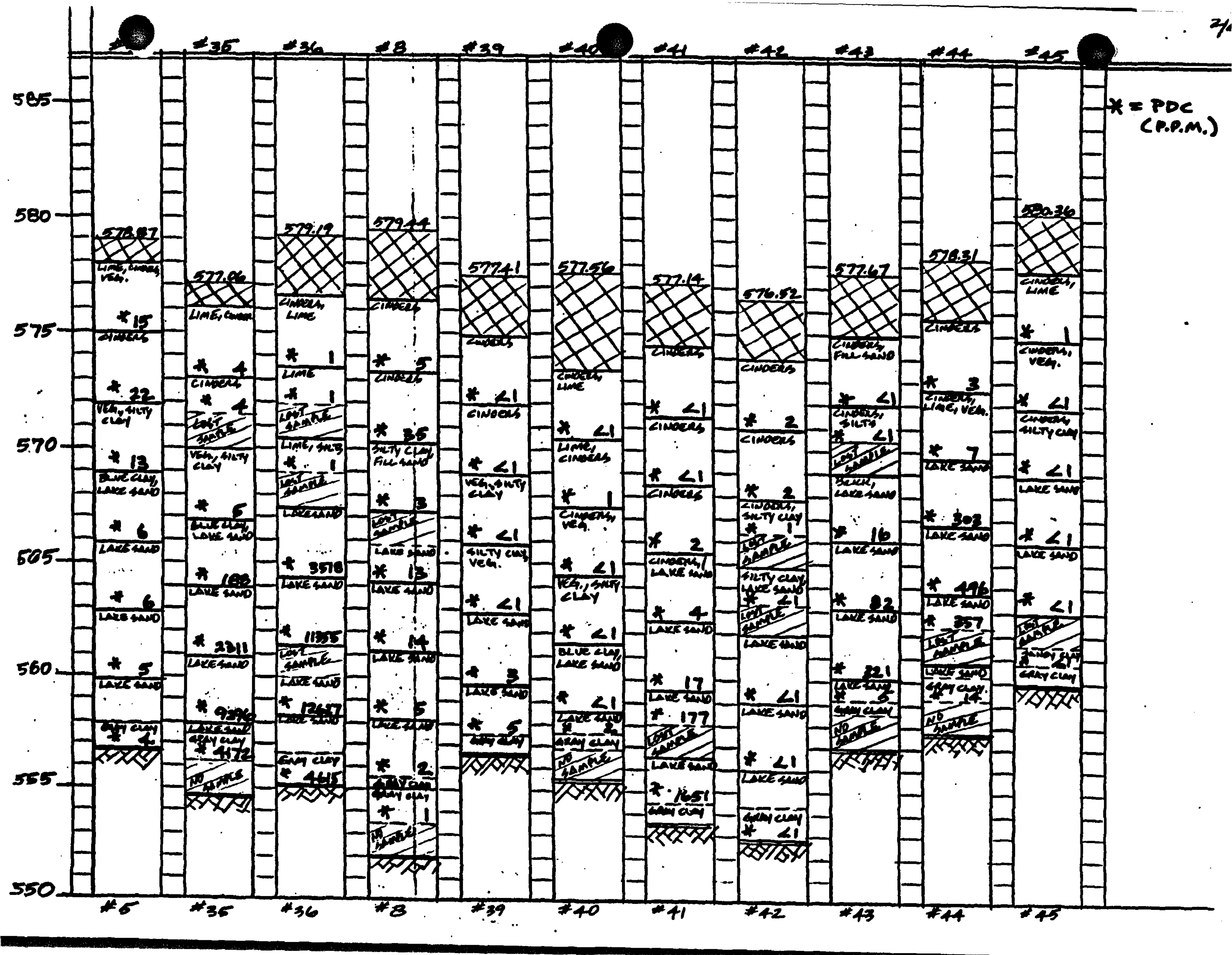


NOTES:

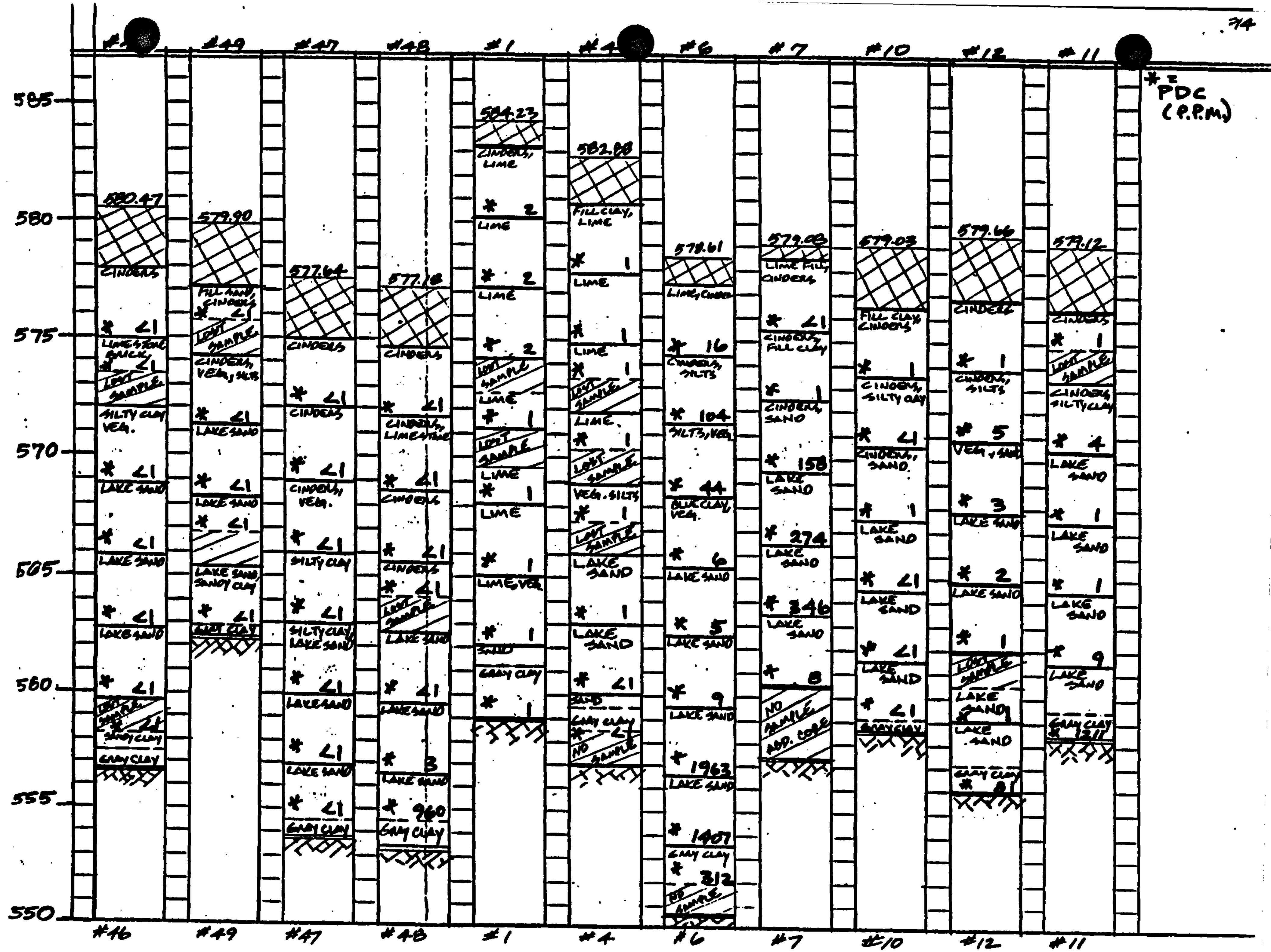
$+^{n}$ = COMPOSITE OF INDICATED STRATA
n = 1, 2' IE +, ++, +++, etc

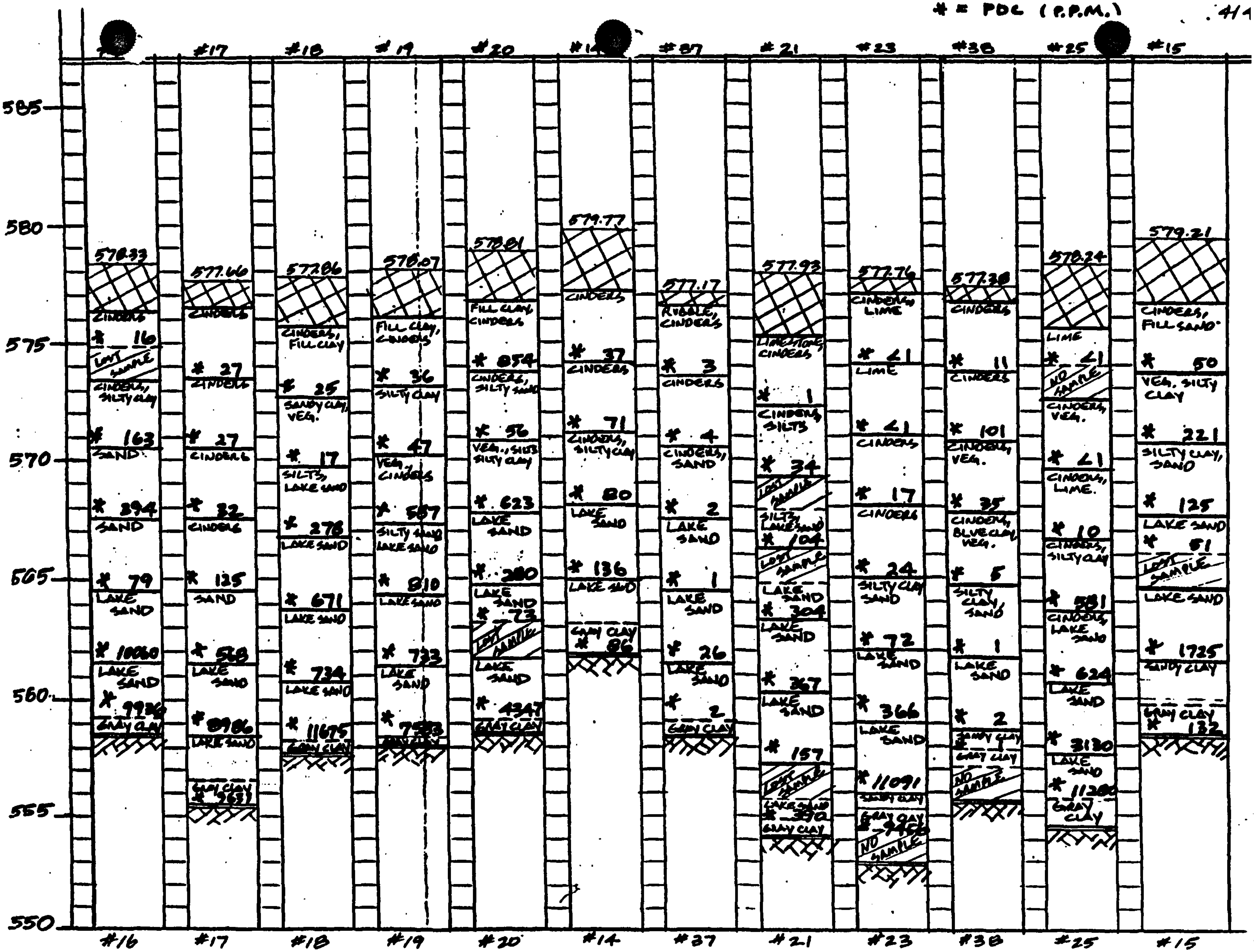
ALL SAMPLES ANALYZED ARE COMPOSITES OF 3' SECTION
N/A = NOT AVAILABLE - CORE LOST ON RETRIEVAL


* = PDC (PPM)
585
580
575
570
565
560
555
550
#27
#2
#3
#26
#28
#29
#30
#31
#32
#33
#34
577.94
GRAVEL
* <1
NO SAMPLE
LIQ. CINDERS
* <1
VEG. SILTS CLAY
* <1
VEG. SILTS
GRAY CLAY
* <1
577.29
GRAVEL, CINDERS
* 1
CINDERS
* 1
VEG. SILTS
GRAY CLAY
* 1
577.01
LIME, CINDERS
* 1
CINDERS
* 3
CINDERS, VEG. BLUE CLAY
* 87
BLUE CLAY, VEG.
* 80
LAKE SAND
* 8
GRAY CLAY
* 3
NO SAMPLE
577.31
LIME, CINDERS
* <1
FILL CLAY, VEG.
* <1
VEG. BLUE CLAY
* 8
BLUE CLAY, SAND
* 5
LAKE SAND
* 14
SANDY CLAY
GRAY CLAY
* 10
576.96
LIME, CINDERS
* 1
LIME
* 1874
LIME
* 8373
VEG., SILTS, SAND
* 8772
ABD. HOLE
576.98
GRANULAR LIME
* 342
VEG., SILTS
* 359
BLUE CLAY
* 490
SILTS
* 1782
LOST SAMPLE
LAKE SAND
* 1319
GRAY CLAY
577.19
GRANULAR LIME
* 24
LIQ., LIME
* 713
SILTS, BLUE CLAY
* 474
LOST SAMPLE
VEG. SILT, SAND
* 511
LAKE SAND
GRAY CLAY
* 10
577.36
LIME
* 11
LOST SAMPLE
LIME, SILTS
* 13
LIME, CINDERS
* 987
VEG. SILTS
GRAY CLAY
* 186
577.19
LIME, RUBBLE
* 86
GRAVEL, VEG., LIME
* 5722
VEG., BLUE CLAY
* 2708
SILTS, LAKE SAND
* 8917
LAKE SAND
* 8657
LAKE SAND
GRAY CLAY
* 118
578.46
LIME
* 50
LOST SAMPLE
LIME, BRICK
* 19
FILL SAND SILTS
* 9673
SILTY CLAY, VEG.
* 10483
LAKE SAND
* 11571
LAKE SAND
* 10900
LOST SAMPLE
LAKE SAND
* 10241
GRAY CLAY
* 2793
NO SAMPLE
578.13
FILL CLAY
* 1047
CINDERS
* 786
CINDERS, SILTS
* 1533
LIQ., SILTS
* 144
LOST SAMPLE
SILTY CLAY LAKE SAND
* 2054
LAKE SAND
* 3916
LAKE SAND
N.A.
GRAY CLAY
N.A.
NO SAMPLE

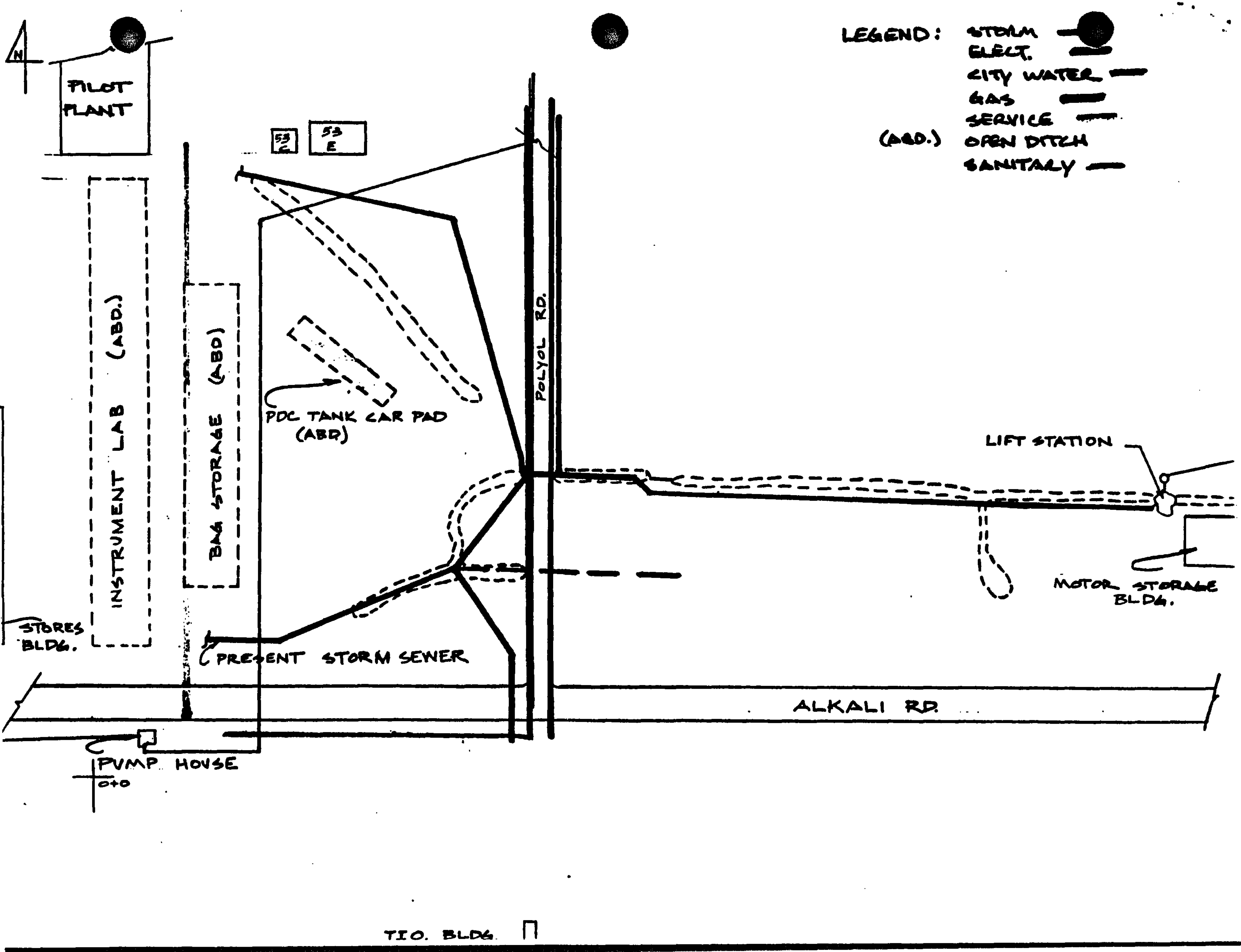


* = PDC (P.P.M.)
585
580
575
570
565
560
555
550
#5
#35
#36
#8
#39
#40
#41
#42
#43
#44
#45
578.87
577.06
579.19
579.44
577.41
577.56
577.14
576.52
577.67
578.31
580.36
LOST SAMPLE
NO SAMPLE
LAKE SAND
GRAY CLAY
CINDERS


* = PDC (P.P.M.)
585
580
575
570
565
560
555
550
#46
580.47
CINDERS
* <1
LIMESTONE BRICK
* <1
LOST SAMPLE
SILTY CLAY VEG.
* <1
LAKE SAND
* <1
LAKE SAND
* <1
LAKE SAND
* <1
LOST SAMPLE
* <1
SANDY CLAY
GRAY CLAY
#49
579.90
FILL SAND, CINDERS
* <1
LOST SAMPLE
CINDERS, VEG., SILTS
* <1
LAKE SAND
* <1
LAKE SAND
* <1
LAKE SAND, SANDY CLAY
* <1
SILTY CLAY
#47
577.64
CINDERS
* <1
CINDERS
* <1
CINDERS, VEG.
* <1
SILTY CLAY
* <1
SILTY CLAY, LAKE SAND
* <1
LAKE SAND
* <1
LAKE SAND
* <1
GRAY CLAY
#48
577.18
CINDERS
* <1
CINDERS, LIMESTONE
* <1
CINDERS
* <1
CINDERS
* <1
LOST SAMPLE
LAKE SAND
* <1
LAKE SAND
* 3
LAKE SAND
* 960
GRAY CLAY
#1
584.23
CINDERS, LIME
* 2
LIME
* 2
LIME
* 2
LOST SAMPLE
LIME
* 1
LOST SAMPLE
LIME
* 1
LIME
* 1
LIME, VEG.
* 1
SAND
GRAY CLAY
* 1
#4
582.88
FILL CLAY, LIME
* 1
LIME
* 1
LIME
* 1
LOST SAMPLE
LIME
* 1
LOST SAMPLE
VEG., SILTS
* 1
LOST SAMPLE
LAKE SAND
* 1
LAKE SAND
* <1
SAND
GRAY CLAY
* <1
NO SAMPLE
#6
578.61
LIME, CINDERS
* 16
CINDERS, SILTS
* 104
SILTS, VEG.
* 44
BLUE CLAY, VEG.
* 6
LAKE SAND
* 5
LAKE SAND
* 9
LAKE SAND
* 1963
LAKE SAND
* 1407
GRAY CLAY
* 312
NO SAMPLE
#7
579.08
LIME FILL, CINDERS
* <1
CINDERS, FILL CLAY
* 1
CINDERS, SAND
* 158
LAKE SAND
* 274
LAKE SAND
* 346
LAKE SAND
* 8
NO SAMPLE ADD. CORE
#10
579.03
FILL CLAY, CINDERS
* 1
CINDERS, SILTY CLAY
* <1
CINDERS, SAND
* 1
LAKE SAND
* <1
LAKE SAND
* <1
LAKE SAND
* <1
GRAY CLAY
#12
579.66
CINDERS
* 1
CINDERS, SILTS
* 5
VEG., SAND
* 3
LAKE SAND
* 2
LAKE SAND
* 1
LOST SAMPLE
LAKE SAND
LAKE SAND
GRAY CLAY
* 81
#11
579.12
CINDERS
* 1
LOST SAMPLE
CINDERS, SILTY CLAY
* 4
LAKE SAND
* 1
LAKE SAND
* 1
LAKE SAND
* 9
LAKE SAND
GRAY CLAY
* 1211



* = PDC (P.P.M.)
585
580
575
570
565
560
555
550
#16
578.33
CINDERS
* 16
LOST SAMPLE
CINDERS, SILTY CLAY
* 163
SAND
* 394
SAND
* 79
LAKE SAND
* 1060
LAKE SAND
* 9936
GRAY CLAY
#17
577.66
CINDERS
* 27
CINDERS
* 27
CINDERS
* 32
CINDERS
* 125
SAND
* 568
LAKE SAND
* 8986
LAKE SAND
GRAY CLAY
* 9631
#18
577.86
CINDERS, FILL CLAY
* 25
SANDY CLAY, VEG.
* 17
SILTS, LAKE SAND
* 278
LAKE SAND
* 671
LAKE SAND
* 734
LAKE SAND
* 11675
GRAY CLAY
#19
578.07
FILL CLAY, CINDERS
* 36
SILTY CLAY
* 47
VEG., CINDERS
* 587
SILTY CLAY
LAKE SAND
* 810
LAKE SAND
* 733
LAKE SAND
* 7583
GRAY CLAY
#20
578.81
FILL CLAY, CINDERS
* 854
CINDERS, SILTY SAND
* 56
VEG., SILTS SILTY CLAY
* 623
LAKE SAND
* 280
LAKE SAND
* 73
LOST SAMPLE
LAKE SAND
* 4347
GRAY CLAY
#14
579.77
CINDERS
* 37
CINDERS
* 71
CINDERS, SILTY CLAY
* 80
LAKE SAND
* 136
LAKE SAND
GRAY CLAY
* 86
#37
577.17
RUBBLE, CINDERS
* 3
CINDERS
* 4
CINDERS, SAND
* 2
LAKE SAND
* 1
LAKE SAND
* 26
LAKE SAND
* 2
GRAY CLAY
#21
577.93
LIMESTONE, CINDERS
* 1
CINDERS, SILTS
* 34
LOST SAMPLE
SILTS, LAKE SAND
* 104
LOST SAMPLE
LAKE SAND
* 304
LAKE SAND
* 367
LAKE SAND
* 157
LOST SAMPLE
LAKE SAND
* 390
GRAY CLAY
#23
577.76
CINDERS, LIME
* <1
LIME
* <1
CINDERS
* 17
CINDERS
* 24
SILTY CLAY SAND
* 72
LAKE SAND
* 366
LAKE SAND
* 11091
SANDY CLAY
GRAY CLAY
NO SAMPLE
#38
577.38
CINDERS
* 11
CINDERS
* 101
CINDERS, VEG.
* 35
CINDERS, BLUE CLAY, VEG.
* 5
SILTY CLAY, SAND
* 1
LAKE SAND
* 2
SANDY CLAY
GRAY CLAY
NO SAMPLE
#25
578.24
LIME
* <1
NO SAMPLE
CINDERS, VEG.
* <1
CINDERS, LIME.
* 10
CINDERS, SILTY CLAY
* 581
CINDERS, LAKE SAND
* 624
LAKE SAND
* 3130
LAKE SAND
* 11280
GRAY CLAY
#15
579.21
CINDERS, FILL SAND
* 50
VEG., SILTY CLAY
* 221
SILTY CLAY, SAND
* 125
LAKE SAND
* 51
LOST SAMPLE
LAKE SAND
* 1725
SANDY CLAY
GRAY CLAY
* 132



N
PILOT PLANT
53 C
53 E
LEGEND:
STORM
ELECT.
CITY WATER
GAS
SERVICE
(ABD.) OPEN DITCH
SANITARY
INSTRUMENT LAB (ABD.)
BAG STORAGE (ABD)
PDC TANK CAR PAD (ABD)
POLYOL RD.
LIFT STATION
MOTOR STORAGE BLDG.
STORES BLDG.
PRESENT STORM SEWER
ALKALI RD.
PUMP HOUSE
0+0
TIO. BLDG.

APPENDIX K

10 Jan 92 PAGE 1

ADAM BICKEL
BASF CORPORATION
1609 BIDDLE AVE
WYANDOTTE MI 48192

USPCI
A Subsidiary of
Union Pacific Corporation

Analytical Services

SAMPLE IDENTIFICATION: 10009273

CUSTOMER IDENTIFICATION: A633

REPORT NUMBER: 1893
DATE SAMPLED: 12/13/91
TYPE OF MATERIAL: SOLID

DATE RECEIVED: 12/18/91
DATE COMPLETED: 01/10/92

PARAMETER	REFERENCE METHOD	PRACTICAL QUANTITATION LIMIT	RESULT
Reactive Cyanide ✓	EPA 7.3.3	50 mg/kg	BDL mg/kg
Reactive Sulfide ✓	EPA 7.3.4	125 mg/kg	BDL mg/kg
* Flashpoint			
Flashpoint	SW 1020		<60 F
EP-TOX Metals			
Copper ✓	SW 6010	0.01 mg/l	0.06 mg/l
Zinc ✓	SW 6010	0.01 mg/l	0.21 mg/l
TCLP Metals			
Arsenic	SW 6010	0.1 mg/l	BDL mg/l
Barium	SW 6010	0.01 mg/l	0.16 mg/l
Cadmium	SW 6010	0.01 mg/l	BDL mg/l
Chromium	SW 6010	0.01 mg/l	BDL mg/l
Lead	SW 6010	0.1 mg/l	0.5 mg/l
Selenium	SW 6010	0.1 mg/l	BDL mg/l
Silver	SW 6010	0.01 mg/l	BDL mg/l
% Recovery Metals			
Arsenic	SW 6010		95 % Rec
Barium	SW 6010		92 % Rec
Cadmium	SW 6010		86 % Rec
Chromium	SW 6010		94 % Rec
Lead	SW 6010		89 % Rec
Selenium	SW 6010		95 % Rec

BDL = BELOW QUANTITATION LIMIT % REC = PERCENT RECOVERY (T) = TOTALS

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10 Jan 92 PAGE 2
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REPORT NUMBER: 1893
DATE SAMPLED: 12/13/91
TYPE OF MATERIAL: SOLID

DATE RECEIVED: 12/18/91
DATE COMPLETED: 01/10/92

PARAMETER	REFERENCE METHOD	PRACTICAL QUANTITATION LIMIT	RESULT
Silver	SW 6010		82 % Rec
Reportable Metals			
Arsenic	SW 6010	0.1 mg/l	BDL mg/l
Barium ✓	SW 6010	0.01 mg/l	0.17 mg/l
Cadmium ✓	SW 6010	0.01 mg/l	BDL mg/l
Chromium ✓	SW 6010	0.01 mg/l	BDL mg/l
Lead ✓	SW 6010	0.1 mg/l	0.6 mg/l
Selenium ✓	SW 6010	0.1 mg/l	BDL mg/l
Silver ✓	SW 6010	0.01 mg/l	BDL mg/l
TCLP Mercury			
Mercury	SW 7470	0.0005 mg/l	BDL mg/l ✓
% Recovery Mercury			
Mercury	SW 7470		101. % Rec
Reportable Mercury ✓			
Mercury	SW 7470	0.0005 mg/l	BDL mg/l
Volatiles			
Chloroform	SW 8260	1000 mg/kg	BDL mg/kg
Vinyl chloride	SW 8260	2000 mg/kg	BDL mg/kg
Chlorobenzene	SW 8260	1000 mg/kg	BDL mg/kg
Tetrachloroethene	SW 8260	1000 mg/kg	BDL mg/kg
Benzene	SW 8260	1000 mg/kg	52500 mg/kg
Carbon Tetrachloride	SW 8260	1000 mg/kg	BDL mg/kg
1,2-Dichloroethane	SW 8260	1000 mg/kg	BDL mg/kg

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REPORT NUMBER: 1893
DATE SAMPLED: 12/13/91 DATE RECEIVED: 12/18/91
TYPE OF MATERIAL: SOLID DATE COMPLETED: 01/10/92

PARAMETER	REFERENCE METHOD	PRACTICAL QUANTITATION LIMIT	RESULT
Trichloroethene	SW 8260	1000 mg/kg	BDL mg/kg
1,4-Dichlorobenzene	SW 8260	1000 mg/kg	BDL mg/kg
1,1-Dichloroethylene	SW 8260	1000 mg/kg	BDL mg/kg
Methyl ethyl ketone	SW 8260	20000 mg/kg	BDL mg/kg
Pyridine	SW 8260	1000 mg/kg	BDL mg/kg
TCLP Volatiles			
1,1-Dichloroethylene	SW 8260	0.7 mg/l	BDL mg/l
Chloroform	SW 8260	6 mg/l	BDL mg/l
1,2-Dichloroethane	SW 8260	0.5 mg/l	BDL mg/l
Carbon Tetrachloride	SW 8260	0.5 mg/l	BDL mg/l
Trichloroethylene	SW 8260	0.5 mg/l	BDL mg/l
Benzene	SW 8260	0.5 mg/l	402. mg/l
Chlorobenzene	SW 8260	100 mg/l	BDL mg/l
Tetrachloroethene	SW 8260	0.7 mg/l	BDL mg/l
Methyl ethyl ketone	SW 8260	200 mg/l	BDL mg/l
Vinyl Chloride	SW 8260	0.2 mg/l	BDL mg/l
% Recovery Volatiles			
1,1-Dichloroethylene	SW 8260		95 % Rec
Chloroform	SW 8260		93 % Rec
1,2-Dichloroethane	SW 8260		91 % Rec
Carbon Tetrachloride	SW 8260		92 % Rec
Trichloroethylene	SW 8260		91 % Rec
Benzene	SW 8260		55 % Rec
Chlorobenzene	SW 8260		91 % Rec
Tetrachloroethene	SW 8260		87 % Rec
Methyl ethyl ketone	SW 8260		81 % Rec

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REPORT NUMBER: 1893
DATE SAMPLED: 12/13/91 DATE RECEIVED: 12/18/91
TYPE OF MATERIAL: SOLID DATE COMPLETED: 01/10/92

PARAMETER	REFERENCE METHOD	PRACTICAL QUANTITATION LIMIT	RESULT
Vinyl Chloride	SW 8260		87 % Rec
Reportable Volatiles			
1,1-Dichloroethylene	SW 8260	0.7 mg/l	BDL mg/l
Chloroform	SW 8260	6 mg/l	BDL mg/l
1,2-Dichloroethane	SW 8260	0.5 mg/l	BDL mg/l
Carbon Tetrachloride	SW 8260	0.5 mg/l	BDL mg/l
Trichloroethylene	SW 8260	0.5 mg/l	~~BDL mg/l~~
* Benzene	SW 8260	0.5 mg/l	731. mg/l
Chlorobenzene	SW 8260	100 mg/l	~~BDL mg/l~~
Tetrachloroethene	SW 8260	0.7 mg/l	BDL mg/l
Methyl ethyl ketone	SW 8260	200 mg/l	BDL mg/l
Vinyl Chloride	SW 8260	0.2 mg/l	BDL mg/l
Semivolatiles - I			
2,4,6-Trichlorophenol	SW 8270	806 mg/kg	BDL mg/kg
2,4,5-Trichlorophenol	SW 8270	806 mg/kg	BDL mg/kg
Pentachlorophenol	SW 8270	4030 mg/kg	BDL mg/kg
Hexachloroethane	SW 8270	806 mg/kg	BDL mg/kg
Nitrobenzene	SW 8270	806 mg/kg	BDL mg/kg
2,4-Dinitrotoluene	SW 8270	806 mg/kg	BDL mg/kg
Hexachlorobenzene	SW 8270	806 mg/kg	BDL mg/kg
Cresol	SW 8270	806 mg/kg	BDL mg/kg
O-Cresol	SW 8270	806 mg/kg	BDL mg/kg
M-Cresol	SW 8270	806 mg/kg	BDL mg/kg
P-Cresol	SW 8270	806 mg/kg	BDL mg/kg
Hexachlorobutadiene	SW 8270	806 mg/kg	BDL mg/kg
TCLP Semivolatiles			
O-Cresol (D023)	SW 8270	200 mg/l	BDL mg/l

BDL = BELOW QUANTITATION LIMIT % REC = PERCENT RECOVERY (T) = TOTALS

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Analytical Services

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CUSTOMER IDENTIFICATION: A633

REPORT NUMBER: 1893
DATE SAMPLED: 12/13/91
TYPE OF MATERIAL: SOLID

DATE RECEIVED: 12/18/91
DATE COMPLETED: 01/10/92

PARAMETER	REFERENCE METHOD	PRACTICAL QUANTITATION LIMIT	RESULT
M-Cresol (D024)	SW 8270	200 mg/l	BDL mg/l
P-Cresol (D025)	SW 8270	200 mg/l	BDL mg/l
Pentachlorophenol (D037)	SW 8270	100 mg/l	BDL mg/l
2,4,5-Trichlorophenol (D041)	SW 8270	400 mg/l	BDL mg/l
2,4,6-Trichlorophenol (D042)	SW 8270	2.0 mg/l	BDL mg/l
1,4-Dichlorobenzene (D027)	SW 8270	7.5 mg/l	BDL mg/l
2,4-Dinitrotoluene (D030)	SW 8270	0.13 mg/l	BDL mg/l
Hexachlorobenzene (D032)	SW 8270	0.13 mg/l	BDL mg/l
Hexachlorobutadiene (D033)	SW 8270	0.5 mg/l	BDL mg/l
Hexachloroethane (D034)	SW 8270	3.0 mg/l	BDL mg/l
Nitrobenzene (D036)	SW 8270	2.0 mg/l	BDL mg/l
Pyridine (D038)	SW 8270	5 mg/l	BDL mg/l
% Recovery Semivols.			
O-Cresol (D023)	SW 8270		73. % Rec
M-Cresol (D024)	SW 8270		80. % Rec
P-Cresol (D025)	SW 8270		80. % Rec
Pentachlorophenol (D037)	SW 8270		105. % Rec
2,4,5-Trichlorophenol (D041)	SW 8270		92. % Rec
2,4,6-Trichlorophenol (D042)	SW 8270		115. % Rec
1,4-Dichlorobenzene (D027)	SW 8270		78. % Rec
2,4-Dinitrotoluene (D030)	SW 8270		90. % Rec
Hexachlorobenzene (D032)	SW 8270		128. % Rec
Hexachlorobutadiene (D033)	SW 8270		91. % Rec
Hexachloroethane (D034)	SW 8270		81. % Rec
Nitrobenzene (D036)	SW 8270		100. % Rec
Pyridine (D038)	SW 8270		138. % Rec
Reportable Semivols.			
O-Cresol (D023)	SW 8270	200 mg/l	BDL mg/l

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10 Jan 92 PAGE 6

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REPORT NUMBER: 1893
DATE SAMPLED: 12/13/91
TYPE OF MATERIAL: SOLID

DATE RECEIVED: 12/18/91
DATE COMPLETED: 01/10/92

PARAMETER	REFERENCE METHOD	PRACTICAL QUANTITATION LIMIT	RESULT
M-Cresol (D024)	SW 8270	200 mg/l	BDL mg/l
P-Cresol (D025)	SW 8270	200 mg/l	BDL mg/l
Pentachlorophenol (D037)	SW 8270	100 mg/l	BDL mg/l
2,4,5-Trichlorophenol (D041)	SW 8270	400 mg/l	BDL mg/l
2,4,6-Trichlorophenol (D042)	SW 8270	2.0 mg/l	BDL mg/l
1,4-Dichlorobenzene (D027)	SW 8270	7.5 mg/l	BDL mg/l
2,4-Dinitrotoluene (D030)	SW 8270	0.13 mg/l	BDL mg/l
Hexachlorobenzene (D032)	SW 8270	0.13 mg/l	BDL mg/l
Hexachlorobutadiene (D033)	SW 8270	0.5 mg/l	BDL mg/l
Hexachloroethane (D034)	SW 8270	3.0 mg/l	BDL mg/l
Nitrobenzene (D036)	SW 8270	2.0 mg/l	BDL mg/l
Pyridine (D038)	SW 8270	5 mg/l	BDL mg/l
* Corrosivity	SW 9045		<1. pH

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APPENDIX L

EXHIBIT 1

BASF Corporation

BASF

January 10, 1994

VIA FEDERAL EXPRESS

Ms. Linda Beasley
Emergency Support Section
U.S. Environmental Protection Agency, HSE-5J
77 West Jackson Boulevard
Chicago, IL 60604

RE: North Drive Site
Wyandotte, Michigan

Dear Ms. Beasley:

This letter is in response to the U.S. Environmental Protection Agency's Request for Information issued pursuant to CERCLA 104(e) and RCRA 3007(a) regarding the above-referenced Superfund site.

BASF has conducted a thorough investigation in response to the specific questions outlined in USEPA's Information Request. Attached is BASF's written response to the Information Request. In addition, BASF has included a document to supplement the written response.

If you have any questions regarding the response, please feel free to contact Douglas Martin, Attorney for BASF, at (201) 316-3222.

Very truly yours,

Douglas P. Thiel
Manager, Quality & Ecology Services

Attachments

bc: GDurst
DMartin

RESPONSE OF BASF CORPORATION TO EPA'S REQUEST FOR INFORMATION CONCERNING THE NORTH DRIVE SITE / SECOND REQUEST (104(e) REQUESTS)

INTRODUCTORY COMMENTS:

BASF Corporation objects to the scope of the information requested as being outside of the time period at issue. It is known through the review of EPA records that the time in which North Drive was filled at most extended from the 1930s until 1945. This inquiry into a 35 year time period is beyond the scope of the inquiry allowed under CERCLA 104(e). Without waiving that objection, a thorough review was made in preparing the following responses:

In preparing the responses of BASF Corporation, the following employees were consulted and interviewed:

C.K. Axce, former Site General Manager
K. Slowik, Technician in Ecology Services Department
Janice Novachoff, BASF Corporate Library
Douglas P. Thiel, Manager, Quality and Ecology Services Department.

REQUEST NO. 1:

1. In your response, dated March 20, 1992, to U.S. EPA's previous Request for Information, you stated that "approximately one ton of bluish-green material was in the purifier vessel after Michigan Alkali purchased Station I."

a. Identify the final disposition of this material. If disposed on-site, identify where it was disposed. If transported and disposed, identify the means of transportation and the location of final disposal.

b. Identify all Michigan Alkali employees who may have knowledge of the disposition of this material.

RESPONSE:

With respect to BASF's response to EPA's 104(e) information request dated March 20, 1992 a clarification is necessary. Further investigations suggest that the previous estimation of approximately one ton of a bluish-green material was an over-estimate. The amount of material removed from the dismantled purifier vessel was less than previously understood.

a. The ultimate disposition of the material is unknown at this time. It is unlikely that the material would have been taken by Michigan Alkali to the North Drive site, given the fill history of the facility.

b. The only Michigan Alkali employee who may have this knowledge is Mr. Leone. Mr. Leone has suggested the material would have remained on-site and would not have been disposed of off-site.

REQUEST NO. 2:

2. The following questions relate to BASF's or any predecessor corporation's operation and dismantlement of Station I following the purchase from the Detroit City Gas Company.

a. Did BASF or any predecessor corporation continue to purify coke oven gas at Station I after 1936? If so, identify the disposition of nay waste products produced by purification, including location of final disposal.

b. How long did BASF or any predecessor corporation continue to operate Station I? What modifications were made to the Station after 1937?

c. When was the equipment comprising Station I dismantled? Was the work performed by BASF or any predecessor corporation employees? If so, identify any employees who may have participated in the dismantlement. If an outside firm was retained, identify what company or companies dismantled Station I.

d. When Station I was dismantled, did you encounter any waste material or by products associated with previous operations? If so, what was the final disposition of this material?

e. Following dismantlement of Station I, identify each subsequent use of that portion of your property from the date of dismantlement to the present.

RESPONSE:

a. Neither BASF nor the alleged predecessor corporations [Michigan Alkali and JB Ford] operated the purifying vessel at Station I before or after the facility was dismantled in 1936/37.

b. N/A - As BASF and/or its alleged predecessors never operated Station I.

c. It is believed that Detroit City Gas dismantled the purifying vessel. When Michigan Alkali took back the property, one purifying vessel remained on-site (it had been dismantled in part). The dismantling was completed and any the remaining residue was removed from the former Station I area. James Leone is the only known living Michigan Alkali employee involved in this activity.

d. See answer to 1 above.

e. For a period of time, a compressor, gas holder and some above ground piping passed over Station I. This provided coke oven gas to South Works and the finished material operations at North Works. The area is presently vacant property.

REQUEST NO. 3:

3. The following questions relate to environmental investigations you may have performed at the portion of your property where Station I was formerly located (Attachment A depicts the area in question).

a. Have you, or anyone working for you, ever installed a groundwater well within the area shown in Attachment A? If so, provide the well log data and groundwater sample results for each well.

b. Have you, or anyone working for you, ever collected surface soil samples within the area shown in Attachment A? if so, provide all analytical results, photographs, or other information associated with such samples.

c. Have you, or anyone working for you, ever collected subsurface soil samples within the area shown in Attachment A? If so, provide all analytical results, photographs, and other information associated such samples.

RESPONSE:

a. We have no information that a groundwater well was installed within the area at issue and, therefore, there are no well logs data or water samples.

b. There have been no surface samples collected within the area identified in Attachment A.

c. A subsurface sample was collected just outside (southeast) of the area shown in Attachment A on May 1, 1992 from an underground tank called a skimmer pit (see attached analytical data). All materials in the skimmer pit were subsequently disposed of according to current waste management regulations. It is suspected that the materials in the pit originated from the coke oven plant.

REQUEST NO. 4:

4. The following questions relate to your facility's operations from 1925 to 1960.

a. Identify all waste material that was produced by your facility during this time. For each waste material, identify: the source of the material, the volume of material produced, the composition of the material, and its appearance.

b. For each waste material identified above, describe how you disposed the material. Include in this description: the location of disposal (both on-site and off-site disposal), the name and current address of any transporter used for disposal, and the method of disposal.

RESPONSE:

a. There are no known records from which one can determine the waste materials that were generated by this facility during this extended period of time. One can presume that general refuse (paper, office waste) was generated. Beyond that, any other conclusions would be mere speculation.

b. Similarly, there are no records from which one can determine the transporters and disposal facilities used during this extended period of time.

A search for additional information regarding waste generation and disposal is ongoing. Please see BASF's previous response to question #19 (first information request) regarding tar waste.

REQUEST NO. 5:

5. During the 1930s, what type of vehicles were used at your facility? For each type of vehicle, identify: the color, any identification or logo present on the vehicle, the make and model. Provide photographs of typical vehicles if available.

RESPONSE:

We have been unable to locate any information which describes the vehicles, such as color or logos that may have been used by Michigan Alkali or J.B. Ford. Some company newsletters are available at our facility (i.e., some newsletters date back to the 1940s). After a review of those papers, it did not lead us to any information from which we could specify characteristics of the trucks at issue. Furthermore, the photographs within the newsletters are in black and white.

Douglas P. Thiel, being duly sworn on oath, deposes and says that he is authorized to sign the foregoing Responses the EPA's Request for Information, prepared on behalf of BASF Corporation; that he has read the foregoing Responses and subscribed the same on behalf of BASF Corporation; that said Responses were prepared with the assistance and advice of others; that said Responses, subject to inadvertent or undiscovered errors, are not completely based upon his personal knowledge and are, therefore, based on and limited by the records and information still in existence and in the possession of BASF Corporation, presently recollected and thus far discovered in the course of preparation of these Responses; that consequently, BASF Corporation reserves the right to make changes in the responses if it appears at any time that omissions or errors have been made therein, or that more accurate information is available; that subject to limitations set forth herein, said Answers are true to the best of his knowledge, information, and belief.

Douglas P. Thiel

Douglas P. Thiel
Manager, Quality and Ecology
Services
For BASF Corporation

Subscribed and sworn to before me
this 10th day of January, 1994

Christine M. Jackson (Willis)
Notary Public Wayne County, MI
My Commission expires: 6/13/95

BAA05601.WP5

CC: [illegible]

BASF CORPORATION
[illegible]09 BIDDLE AVE.
[illegible]ANDOTTE, MI 48192
ECOLOGY SERVICES DEPARTMENT
FAX NO.: 313/246-6775

LABORATORY SAMPLE NO.: ____________
BASF SAMPLE NO.: ____________
SAMPLE DESCRIPTION: ____________

ANALYTICAL RESULTS REQUIRED BY: 5/8/92

→ Stack Time [illegible]

CHAIN OF CUSTODY RECORD
LABORATORY ANALYSIS REQUEST

COLLECTORS NAME: Adam Brickel   TELEPHONE NO.: (313) 246-6 836

P.O. NUMBER: ____________   RELEASE ORDER NO.: ____________

DATE SAMPLED: 5/1/92 TIME SAMPLED: ________ am/pm

SAMPLING METHOD: GRAB X COMPOSITE ____ OTHER: ____________

SAMPLE DESCRIPTION: ____________

LOCATION OF SAMPLING: PLANT ____________

LOCATION DESCRIPTION Excavation South East of Ottawa & Wyandotte

PROCESS DESCRIPTION: ____________

FIELD INFORMATION: ____________

CHAIN OF POSSESSION

	SIGNATURE	TITLE	ORGANIZATION OR DEPARTMENT	DATE RECEIVED	DATE RELINQUISHED
1)					
2)					
3)					
4)					
5)					
6)					

(REV.10/90)

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

BASF Restricted Document

PAGINATION PROJECT NO : 125282 5Y0160

ANALYTICAL REPORT

PAGINATION	:	125282
DESCRIPTION	:	EXCAVATION SOUTHEAST OF OTTAWA, WYANDOTTE
PROJECT NO.	:	5Y0160
REQUESTOR/ID	:	MARTIN, MICHAEL J / 13283 Ext: 6878
COST CENTER	:	20270
COORDINATOR/ID	:	MARTIN, MICHAEL J / 13283 Ext: 6878
DATE ENTERED	:	05/04/92
DATE FINISHED	:	07/27/92 8/5/92
COPIES TO	:	ADAM BICKEL

INFORMATION/INSTRUCTIONS

Description	Sample #	Test Required
Excavation Southest of Ottawa & Wyandotte	31489	Full TCLP, IR, Identification, Corrosivity, Ignitablity, and Reactivity.

RESULTS

✓ CORROSIVITY T. McGahey

THE PH OF THE TOP AQUEOUS PHASE WAS MEASURED AS 7.45. THE SAMPLE WAS THEN SHAKEN VIGOROUSLY AND THE PH WAS AGAIN MEASURED. THE PH FOR THE SLURRY RANGED FROM 6.40 - 7.45.

FTIR SPECTROSCOPY W. Floutz, L. Barczewski

An IR spectrum for the excavation solids shows mainly inorganic material as a mixture of carbonate and silicate salts. A much lower level organic component is indicated. Acetone extraction of the solids provides an organic fraction with an IR spectrum which is primarily that of a polyether polyol. No indication of hydrocarbons.

X-RAY MICROANALYSIS J.S. Jourdan

EDS analysis of the dried solids showed mostly silicon, calcium, and iron, with lower levels of sodium, magnesium, aluminum, sulfur, chlorine, and potassium.

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

PAGINATION : 125282
PROJECT NO. : 5Y0160

FLASH POINT J.S. Jourdan

The sludge sample was analyzed for flash point using an ERDCO Closed-Cup (Seta) Flash Point Apparatus. No* flash point below 300°C was detected.

* - Initial measurements suggested a flash point at 80°C due to flame being extinguished when introduced into the chamber. However, no "flash" normally associated with the test was observed. Subsequent tests using distilled water showed that enough water vapor is emitted at 80°C to extinguish the test flame when it is introduced into the sample chamber. Further tests using less sample proved negative for flash point. Tests using dried soil also showed no flash. A sample of the sludge was even tested for ignitability by directing an open flame on it. The sludge dried without burning.

TCLP VOLATILES BY GC/MS - S.C.WALKINSHAW

THIS SAMPLES WAS EXTRACTED ACCORDING TO THE TCLP METHOD AND THEN ANALYZED ACCORDING TO EPA METHOD 625. SAMPLE HAD TO BE DILUTED 10X AND 50X FOR ANALYSIS.

	CONC. (PPB)	
COMPOUND	BLANK	31489 (SLUDGE)
VINYL CHLORIDE	ND	5200
1,1,-DICHLOROETHENE	ND	ND
CHLOROFORM	ND	ND
1,2-DICHLOROETHANE	ND	160*
BENZENE	ND	8100
CARBON TETRACHLORIDE	ND	ND
TRICHLOROETHENE	ND	2000
TETRACHLOROETHENE	ND	ND
CHLOROBENZENE	ND	53000
METHYLETHYL KETONE	ND	ND

DETECTION LIMITS ARE ~5PPB FOR ALL COMPOUNDS EXCEPT MEK WHICH IS ~50PPB. SINCE THE SAMPLE WAS DILUTED, THE DETECTION LIMITS ARE 10X OR 50X THOSE GIVEN.

* = QUANTITATION BASED ON 50X DIL., ALL OTHERS BASED ON 10X DIL.

GC/MS ANALYSIS OF SEMI-VOLATILES - S.C.WALKINSHAW

These samples were extracted using the TCLP procedure and analyzed according to EPA Method 625.

	Conc. (PPM)		
ACIDS:	31489	BLANK	REG. LEVEL
Total Cresols (o-,m-, & p-)	.075	ND	200*
Pentachlorophenol	ND	ND	100
2,4,5-Trichlorophenol	.075	ND	400
2,4,6-Trichlorophenol	ND	ND	2.0

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

SURROGATE RECOVERY	31489(%)	BLANK(%)
2-FLUOROPHENOL	26	35
d5-PHENOL	17	26
2,4,6-TRIBROMOPHENOL	37	49

METHOD STD SPIKE RECOVERY(%):

	31493MSTD	%RECOVERY LIMITS
PENTACHLOROPHENOL	51	14-176

SURROGATE RECOVERY	31493MSTD(%)
2-FLUOROPHENOL	43
d5-PHENOL	30
2,4,6-TRIBROMOPHENOL	54

NOTES:
1. ND = not detected
2. Detection limits are ~5ppb.
3. * = The cresol isomers are reported as total cresol because 2 of the isomers are not resolved. Also the TCLP regulatory levels are given as 200mg/L for each cresol isomer and 200mg/L for total cresol, which implies a limit of 200mg/L for each isomer with the total of the 3 isomers not more than 200mg/L.

	CONC.(PPM) 31489	BLANK	REG. LEVEL
BASE/NEUTRALS:			
1,4-DICHLOROBENZENE	.0075	ND	7.5
HEXACHLOROETHANE	ND	ND	3.0
NITROBENZENE	ND	ND	2.0
HEXACHLOROBUTADIENE	ND	ND	0.5
2,4-DINITROTOLUENE	ND	ND	0.13
HEXACHLOROBENZENE	ND	ND	0.13
PYRIDINE	ND	ND	5.0

SURROGATE RECOVERY	31489(%)	BLANK(%)
NITROBENZENE-d5	75	68
2-FLUOROBIPHENYL	83	69
p-TERPHENYL-d14	57	0

METHOD STD SPIKE RECOVERY(%):

	31493MSTD	%RECOVERY LIMITS
BASE/NEUTRALS:		
1,4-DICHLOROBENZENE	63	20-124
2,4-DINITROTOLUENE	61	39-139

SURROGATE RECOVERY	31493MSTD(%)
NITROBENZENE-d5	46
2-FLUOROBIPHENYL	61
p-TERPHENYL-d14	80

APPROVAL: Michael J. Martin

BASF CORPORATION
POLYMERS DIVISION
RESEARCH SERVICES

ANALYTICAL REPORT

NOTES:
1. ND = NOT DETECTED
2. Detection Limits are ~ 5ppb.

____Metals Analysis--N. M. Less____

These samples were prepared following the Toxicity Characteristic Leaching Procedure (TCLP), Method 1311. The samples were analyzed for mercury using cold vapor atomic absorption spectroscopy and for all other metals using inductively coupled plasma atomic emission spectroscopy. Values which are less than the method detection limit (MDL) are reported as not detected (ND). Other values which are greater than the MDL but less than the practical quantification limit (PQL) are reported as "< PQL".

	Blk #31489	#31489	MDL	Reg. Limit
Arsenic (ppm)	ND	<0.1	0.03	5.0
Barium (ppm)	ND	<0.5	0.003	100.
Cadmium (ppm)	ND	<0.02	0.003	1.0
Chromium (ppm)	ND	0.09	0.009	5.0
*Copper (ppm)	ND	<0.05	0.003	---
Lead (ppm)	ND	<0.2	0.04	5.0
Mercury (ppm)	ND	ND	0.0004	0.2
*Nickel (ppm)	ND	0.38	0.01	---
Selenium (ppm)	ND	ND	0.05	1.0
Silver (ppm)	ND	****	0.003	5.0
*Zinc (ppm)	<0.05	0.14	0.003	---

*: The values listed for copper, nickel, and zinc are from the analysis of the neat (i.e. undigested) samples. The digested samples were not prepared for the analysis of these metals.

****Note: Sample RS #31489 had high levels of chloride. The recovery for Ag was poor (3%). The sample had white particulate matter dispersed throughout it. Ammonium hydroxide was added to the sample to dissolve any silver chloride present. The particles were not dissolved by the ammonium hydroxide and are most likely silicon dioxide.

REACTIVITY - CANTON ANALYTICAL LAB
As Cyanide <0.02mg/kg by EPA Method 9010 Analyzed on 5/11/92 by DM
As Sulfide <0.1 mg/kg by EPA Method 9030 Analyzed on 5/12/92 by DM

APPROVAL: Michael J. Martin

APPENDIX L

EXHIBIT 2

BASF Corporation

BASF

February 3, 1994

Ms. Linda Beasley
Emergency Support Section
U.S. Environmental Protection Agency, HSE-5J
77 West Jackson Boulevard
Chicago, IL 60604

RE: North Drive Site
Wyandotte, Michigan

Dear Ms. Beasley:

This letter is in response to the U.S. Environmental Protection Agency's Request for Information issued pursuant to CERCLA 104(e) and RCRA 3007 (a) regarding the above-referenced Superfund site.

Attached is an amendment and supplementation of BASF's previously submitted responses to the Information Request.

If you have any questions regarding the response, please feel free to contact Douglas Martin, Attorney for BASF, at (201) 316-3222.

Very truly yours,

Douglas R. Thiel
Manager, Quality & Ecology Services

Attachments

bc: GDurst
DMartin

1609 Biddle Avenue, Wyandotte, Michigan 48192 (313) 246-6100

Douglas P. Thiel, being duly sworn on oath, deposes and says that he is authorized to sign the foregoing Responses to EPA's Request for Information, prepared on behalf of BASF Corporation; that he has read the foregoing Responses and subscribed the same on behalf of BASF Corporation; that said Responses were prepared with the assistance and advice of others; that said Responses, subject to inadvertent or undiscovered errors, are not completely based upon his personal knowledge and are, therefore, based on and limited by the records and information still in existence and in the possession of BASF Corporation, presently recollected and thus far discovered in the course of preparation of these Responses; that consequently, BASF Corporation reserves the right to make changes in the responses if it appears at any time that omissions or errors have been made therein, or that more accurate information is available; that subject to limitations set forth herein, said Answers are true to the best of his knowledge, information, and belief.

Douglas P. Thiel

Douglas P. Thiel
Manager, Quality and Ecology Services
For BASF Corporation

Subscribed and sworn to before me
this 4th day of January, 1994

Lori D. Hass

LORI D. HASS
NOTARY PUBLIC - WAYNE COUNTY, MICH.
MY COMMISSION EXPIRES 4-27-94

Notary Public
My Commission expires: 4-27-94

AMENDMENT AND SUPPLEMENTATION OF BASF CORPORATION'S RESPONSE TO EPA'S REQUEST FOR INFORMATION CONCERNING THE NORTH DRIVE SITE FIRST AND SECOND REQUESTS PURSUANT TO SECTION 104(e)

I First 104(e)

5. Is BASF a successor in interest to the liabilities and/or assets of J. B. Ford Company? If your answer is anything but an unqualified "yes", explain in detail BASF's relationship with the entity and provide a detailed explanation for your denial of assumption of liabilities and/or assets.

In approximately 1980 the manufacturing operations that formally constituted the J. B. Ford Company, known as the Chemical Specialties Division, was sold by BASF Wyandotte Corporation to Diversey Corporation, a subsidiary of Molson Companies, Ltd., of Canada. This portion of the corporate history of J. B. Ford Company had been inadvertently excluded in the description provided to Request No. 5. This further information is provided to identify a successor to the J. B. Ford Company.

Second Request

4. Identify all persons having knowledge or information about the generation, transportation, treatment, disposal or other handling of hazardous substances by you, your contractors, or by prior owners and/or operators.

Identification of waste generation and disposal, as indicated, is ongoing. This information is provided on the issue of Prussian Blue. This response is consistent with the information provided in all 104(e) responses submitted to date. This information was also provided in the course of discovery, of which the US EPA has had access. BASF Corporation has completed a comprehensive review of the processes that would have been associated with the operations of Michigan Alkali and J. B. Ford (the alleged predecessors of BASF Corporation). A summary of those findings is included in the attachment. This summary was prepared jointly by current BASF employees Barry Barkel, Senior Engineer Associate and Doug Thiel, Quality and Ecology Services Manager. In summary, all information reviewed to-date has indicated that the Prussian Blue (or what has been referenced as "blue waste material"), was not generated by these companies. The manufacturing processes of J. B. Ford and Michigan Alkali are inconsistent with the generation of Prussian Blue. These companies did not purify gas so as to create such a waste stream. Interviews of employees that may have had contact with J. B. Ford and Michigan Alkali confirmed this type of waste was not generated. Furthermore, the interviews of individuals as identified in the first and second 104(e) has confirmed that there is no evidence that J. B. Ford or Michigan Alkali disposed of waste on North Drive or that these companies generated the waste at issue.

A SUMMARY OF KNOWN OPERATIONS AT THE NORTH WORKS ON BIDDLE AVENUE AND THE WEST PLANT (CHEMICAL SPECIALTIES)

FOR THE PERIOD 1930-1960

THE INFORMATION AVAILABLE INDICATES THAT THE FOLLOWING PROCESSES AND OPERATIONS WERE ONGOING AT THE NORTH WORKS AND THE WEST PLANT FOR A PORTION OF THE SUBJECT PERIOD:

1. <u>KREELON</u> - LOCATED IN A BUILDING STILL EXISTING ON BIDDLE AVENUE AT THE NORTH END OF THE NORTH WORKS PROPERTY. THIS OPERATION PRODUCED TWO PRIMARY PRODUCTS:

    - KREELON, ALKYLARYLSULFONATE, WAS PRODUCED FOR USE AS A COMMERCIAL DETERGENT. IT WAS A WHITE POWDER PRODUCED BY A MULTI STEP REACTION INVOLVING KEROSENE, BENZENE, SULFURIC ACID AND SODIUM HYDROXIDE. RESEARCH INTO THE PRODUCTION INDICATES THAT SOLID WASTE WAS NOT GENERATED FROM THIS OPERATION.

    - CARBOSE, CARBOXYMETHYLCELLULOSE, WAS PRODUCED FOR USE AS A THICKENING AGENT FOR TOOTHPASTE, COSMETIC, AND OTHER PRODUCTS. IT WAS A WHITE TO CREAM COLORED POWDER PRODUCED BY DIGESTING CELLULOSE FROM PAPER WITH SODIUM HYDROXIDE AND THEN REACTING WITH CHLOROACETIC ACID. RESEARCH INTO THE PRODUCTION INDICATES THAT SOLID WASTE WAS NOT GENERATED . POTENTIALLY A SMALL AMOUNT OF UNDIGESTED PAPER RESIDUE AND POSSIBLY OCCASIONAL OFF SPEC. MATERIAL WAS GENERATED AND WOULD HAVE HAD TO BE HANDLED.

2. PACKAGE PLANT - LOCATED ON PERRY PLACE AT THE EXTREME NORTH END OF THE NORTH WORKS. ITS LOCATION IS NOW UNDER THE NEW EPO BULK LOADING BUILDING. THIS BUILDING WAS USED PRIMARILY FOR THE PACKAGING OF COMMERCIAL CLEANING PRODUCTS FROM BULK MATERIAL. IT ALSO BLENDED SOME DETERGENTS AND CLEANING PRODUCT IN BATCH VESSELS AND PRODUCED SODIUM METASILICATE FROM CAUSTIC AND SILICA. MOST OF THE PRODUCTS PRODUCED WERE WHITISH IN COLOR. DUE TO THE NATURE OF THE PHYSICAL BENDING OPERATIONS (VS CHEMICAL REACTION) THERE WERE VIRTUALLY NO WASTE OR BY-PRODUCTS GENERATED EXCEPT OCCASIONAL OFF SPEC. PRODUCT WHICH HAD TO BE HANDLED.

3. POLYOL PLANT - THIS PLANT WAS LOCATED AT THE NORTH END OF THE NORTH WORKS. THERE IS CURRENTLY A MUCH LARGER POLYOL PLANT OPERATING IN THE SAME AREA, BUT THE UNIT WHICH WAS OPERATIVE FROM THE MID 50'S TO 1960 HAS BEEN CONVERTED TO THE PRESENT DAY EPO PROCESS PLANT. THIS PLANT PRODUCED A VARIETY OF POLYETHER POLYOLS FOR USE PRIMARILY IN DETERGENTS, BUT ALSO FINDING USE IN THE DEVELOPING AREA OF URETHANE CHEMISTRY. THE ONLY KNOWN SOLID WASTE ASSOCIATED WITH POLYOL PRODUCTION WAS USED FILTER CAKE (MAGNESIUM SILICATE). THIS WHITISH MATERIAL WAS USED FOR FILLING LOW AREAS ON THE NORTH WORKS IN AN AREA BEHIND THE CURRENT VITAMINS ADMINISTRATIVE OFFICE.

4. COKE PLANT - THIS PLANT WAS LOCATED SOUTH AND EAST OF THE EXISTING POLYOL PLANT. IT WAS A CONVENTIONAL COKE BATTERY WHICH TURNED COAL INTO COKE, VARIOUS GASEOUS BY-PRODUCTS AND COAL TAR. THE COKE WAS BOTH SOLD AND USED AT THE NORTH WORKS. THE BY-PRODUCT GASSES WERE RECOVERED FOR USE AND THE COAL TAR WAS REPORTEDLY SOLD. SOME OF THIS BLACK TARRY MATERIAL IS KNOWN TO HAVE BEEN USED TO FILL LOW AREAS AT THE NORTH WORKS.

5. LIME KILNS - THE KILNS WERE LOCATED IN THE CENTER OF THE NORTH WORKS PROPERTY. THIS PLANT BURNED LIMESTONE WITH COKE AND NATURAL GAS TO MAKE CARBON DIOXIDE AND LIME BOTH OF WHICH WERE USED AT THE NORTH WORKS. THE ONLY WASTE MATERIAL WOULD HAVE BEEN OCCASIONAL OFF SPEC. LIME, A GRAYISH WHITE LUMPY SOLID WHICH EITHER WOULD HAVE BEEN REWORKED TO FINISHED PRODUCT OR DISPOSED OF TO A LANDFILL DEPENDING ON THE NATURE OF THE MATERIAL.

6. BOILER HOUSE - THE BOILER HOUSE WAS LOCATED IN THE CENTER OF THE NORTH WORKS ON THE RIVER. MULTIPLE COAL FIRED BOILERS PRODUCED STEAM AND ELECTRICITY. THE ONLY KNOWN SOLID WASTES WERE CLINKERS AND CINDERS. THESE BROWNISH TO BLACK PARTICLES WERE USED AS FILL AND ROAD SURFACING MATERIAL AT THE NORTH WORKS SITE.

7. SODA ASH COMPLEX - THIS COMPLEX WAS LOCATED IN THE CENTER OF THE NORTH WORKS NEAR THE RIVER. THIS WAS A SET OF INTER CONNECTED PLANTS WHICH UTILIZED SALT BRINE, AMMONIA, CARBON DIOXIDE, AND LIME TO MAKE PRODUCTS VIA THE SOLVAY PROCESS. THE UNITS MAY BE SEPARATED AS FOLLOWS:

   - SODA ASH (SODIUM CARBONATE) - THIS PLANT MADE SODIUM CARBONATE FOR USE IN MANUFACTURING GLASS, IN CLEANING COMPOUNDS, AND OTHER USES. IT WAS A WHITE POWDER. THE MAJOR WASTE PRODUCT FROM THE PROCESS WAS CALLED DISTILLER BLOW-OFF (DBO) WHICH CONSISTED OF A MIXTURE OF CALCIUM AND SODIUM SULFATE, CALCIUM AND SODIUM CHLORIDE AND SODIUM CARBONATE AND SOME EXCESS LIME. THE DBO SLURRY WENT TO SETTLING BEDS ON THE NORTH WORKS PROPERTY AND TO OFF-SITE LOCATIONS (HENNEPIN POINT AND FIGHTING ISLAND) TO PRECIPITATE OUT THE SOLIDS.

- PURECAL (CALCIUM CARBONATE) - THIS PLANT PURIFIED AND DRIED A BY-PRODUCT FROM THE SODA ASH OPERATIONS FOR SALE AS AN INERT FILLER MATERIAL IN PAPER AND OTHER PRODUCTS. PURECAL WAS A PURE WHITE POWDER. THERE WERE NO SIGNIFICANT WASTES GENERATED FROM THIS OPERATION. IT IS SUSPECTED THAT ANY WASTE GENERATED WOULD HAVE BEEN USED AS FILL IN LOW AREAS ON THE NORTH WORKS PROPERTY.

- SODIUM BICARBONATE - THIS PLANT PURIFIED AND REPROCESSED SODIUM CARBONATE TO AN FDA QUALITY PRODUCT SOLD FOR USE AS BAKING SODA. THERE WERE NO SIGNIFICANT WASTES GENERATED FROM THIS OPERATION. IT IS SUSPECTED THAT ANY WASTE GENERATED WOULD HAVE BEEN USED AS FILL IN LOW AREAS ON THE NORTH WORKS PROPERTY.

- CALCIUM CHLORIDE - CALCIUM CHLORIDE WAS A BY-PRODUCT OF SODA ASH PRODUCTION. IT WAS RECOVERED FOR USE AS ROAD SALT AND AS AN ADDITIVE TO CONCRETE. THERE WERE NO WASTES GENERATED IN ASSOCIATION WITH THIS RECOVERY.

8. PILOT PLANT - THIS FACILITY WAS LOCATED IN THE CENTER OF THE NORTH WORKS NORTH OF ALKALI ROAD AND WAS USED FOR THE DEVELOPMENT OF NEW PRODUCTS AND TO PRODUCE SOME OF THEM ON A SMALL SCALE FOR CUSTOMER TRIAL. THE MATERIALS BEING PROCESS VARIED GIVEN THE RESEARCH-BASED OPERATIONS BUT IT IS BELIEVED THAT NO LARGE SCALE VOLUME OF WASTE WAS NOT GENERATED FROM ANY OF THIS WORK.

9. FOUNDRY - THIS FACILITY WAS LOCATED IN THE CENTER OF THE NORTH WORKS JUST EAST OF BIDDLE AVENUE AND PRODUCED IRON CASTINGS FOR USE BY THE COMPANY AND FOR SALE TO OUTSIDE CUSTOMERS. ITS PRINCIPAL WASTE PRODUCT WAS MOLDING SAND, WHICH WAS GENERALLY REPROCESSED. IF NOT REPROCESSED IT IS BELIEVED THAT THE FOUNDRY WASTE WOULD HAVE BEEN USED AS FILL ON THE NORTH WORKS PROPERTY.

10. <u>CHEMICAL SPECIALTIES OPERATIONS</u> - LOCATED ON THE WEST SIDE OF BIDDLE AVENUE WHICH FOR MANY YEARS WAS REFERRED TO AS THE WEST PLANT. THIS OPERATION PRODUCED A VARIETY OF COMMERCIAL CLEANING PRODUCTS IN LIQUID AND POWDER FORMS. PRINCIPLE WASTE PRODUCTS WOULD HAVE BEEN OFF-SPEC. PRODUCT. THE POTENTIAL EXISTED TO GENERATE A SMALL AMOUNT OF OFF SPEC. PRODUCT THAT NEEDED TO BE MANAGED.

ADDITIONAL FACILITIES ON THE SITE DURING THE SUBJECT PERIOD INCLUDE:

- BLACKSMITH SHOP
- CARPENTER SHOP
- PAINT SHOP
- COOPER SHOP
- CENTRAL RESEARCH
- RAIL ROAD SHOP
- PIPE SHOP
- PLATE SHOP
- INSTRUMENT SHOP
- ELECTRIC SHOP
- CENTRAL OFFICE
- AND VARIOUS OTHER MAINTENANCE AND ADMINISTRATIVE BUILDINGS.

NONE OF THESE IS KNOWN TO HAVE GENERATED ANY SIGNIFICANT WASTE, THE MAJORITY OF WHICH WOULD HAVE BEEN GENERAL REFUSE.

APPENDIX L

EXHIBIT 3

BASF Corporation

BASF

March 20, 1992

VIA FEDERAL EXPRESS

Ms. Linda Beasley
Emergency Support Section
U.S. Environmental Protection Agency, HSE-5J
77 West Jackson Boulevard
Chicago, IL 60604

Re: North Drive Site
Wyandotte, Michigan

Dear Ms. Beasley:

This letter is in response to the U.S. Environmental Protection Agency's Request for Information issued pursuant to CERCLA 104(e) and RCRA 3007(a) regarding the above-referenced Superfund site.

BASF has conducted a thorough investigation in response to the specific questions outlined in USEPA's Information Request. Attached is BASF's written response to the Information Request. In addition, BASF has included a number of documents to supplement the written response.

If you have any questions regarding the response, please feel free to contact me at (201) 316-3222.

Very truly yours,

Douglas E. Martin/jmc

Douglas E. Martin
Attorney

Attachments

cc: J. M. Cerra (w/o Exhibits)
D. P. Thiel (w/o Exhibits)
D. E. Webster (w/o Exhibits)

DEM/JMC/NDLTR

Response of BASF Corporation to EPA Request for Information Concerning the North Drive Site

1. Identify all persons consulted in the preparation of the answers to these Information Requests.

ANSWER

Don Smith - Real Estate
BASF Corporation
100 Cherry Hill Road
Parsippany, NJ 07054

Janet Cerra - Legal
BASF Corporation
100 Cherry Hill Road
Parsippany, NJ 07054

Herman P. Shoemaker - Employee Benefits
BASF Corporation
100 Cherry Hill Road
Parsippany, NJ 07054

Gary Slumpff - Insurance Dept.
BASF Corporation
100 Cherry Hill Road
Parsippany, NJ 07054

Douglas P. Thiel - Ecology Services
BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192

Bill Allman (313) 282-2864
Former Maint. Supervisor, Glycol Plant; #1 Chlorine, Calcium Chloride, and NW Yard.

Bill Axce
Former Site Manager, Wyandotte
(Presently consulting with BASF)
1609 Biddle Avenue
Wyandotte, MI 48192

Andy Badyrka
Former employee, Coke Plant

Brazier Beecher (313) 282-1304
Former employee, Soda Ash & Coke Plant

Marv Dokken (313) 382-4715
Former engineer, Kreelon operation run by J.B. Ford

Ted Hayman (703) 961-2337
Former Superintendent, Coke Oven Plant

Mike Honsewitz
Former employee

John Hudson (313) 282-1533
Former Site Controller

Tony & Howard Labadie
Property owners on North Drive

Jim Leone
BASF retiree; Assistant Superintendent, Coke Oven Plant.

George Schwarz (813) 581-3752
Former VP, General Products Division.

Butch Burkhard (313) 282-1304
J.B. Ford Technical Manager

Don Hartwell
Former Engineer at Site

Several former employees provided statements to BASF on the condition that their phone number/address be withheld.

2. Identify all documents consulted, examined, or referred to in the preparation of the answers to these Requests and provide copies of all such documents.

ANSWER Wyandotte Human Resources Employee Records
Wyandotte Ecology Services Department Files
Wyandotte Engineering Files
Parsippany Real Estate Files
Parsippany Legal Dept. Files
Michigan Alkali General Voucher Books dated 1905 - 1938 (Due to the age of the Books and the quality of the print, reproduction was not possible).

(Relevant documents are attached. Refer to all Exhibits).

3. If you have reason to believe that there may be persons able to provide a more detailed or complete response to any Information Request or may be able to provide additional responsive documents, identify such persons.

ANSWER Don Anderson (508) 636-5228
Former General Manager of J.B. Ford Division

Glen Peacock (313) 676-3075
Engineer with responsibility for Kreelon operation run by J.B. Ford.

John F. Hunter (Unlisted Phone)
Former Head of Pollution Control Dept.

<u>Richard Meyer</u> (No success in finding telephone number or address)
Former Superintendent of Coke Plant

4. Identify all persons having knowledge or information about the generation, transportation, treatment, disposal or other handling of hazardous substances by you, your contractors, or by prior owners and/operators.

ANSWER **See answer to Number 1 above.**

5. Is BASF a successor in interest to the liabilities and/or assets of J. B. Ford Company? If your answer is anything but an unqualified "yes," explain in detail BASF's relationship with the entity and provide a detailed explanation for your denial of assumption of liabilities and/or assets.

ANSWER **In 1943 Michigan Alkali Company and J. B. Ford Company conslidated or merged. The new Company was named Wyandotte Chemical Company. In 1960, BASF AG, a German Corporation, purchased Wyandotte Chemical Company. After a series of transactions, Wyandotte Chemical Company became part of BASF Corporation. The transaction documents for the Michigan Alkali Company - J. B. Ford Company consolidation no longer exist. Therefore, I can not say with any degree of certainty whether BASF is the successor in interest to the liabilities of J. B. Ford Company.**

6. Identify all employees who worked at Station I between 1920 and 1945.

ANSWER **Unknown.**

7. Provide all employee records pertaining to Oscar Messer including, but not limited to, job titles and descriptions, and dates of employment.

ANSWER **A personnel record was located for a Curtis Oscar Messer which references Oscar Messer (father) as being employed by Wyandotte Chemicals. No personnel record was located for Oscar Messer.**

See Exhibit #7 attached hereto.

8. During your ownership of the facility or the ownership of the facility by any corporation for which BASF is a successor-in-interest, provide a list of any hazardous wastes produced in the processes employed at the facility, any chemical substances which are byproducts of the process, the chemical composition of any sludges or liquids or other production wastes resulting from the process employed at the facility. Summarize in a short narrative the equipment used to treat, transport

or dispose of such materials.

ANSWER **To our knowledge during the time that Michigan Alkali operated Station 1, there were no hazardous wastes generated except for a one-time event when the purifier vessel was cleaned out after the purchase of Station 1 as indicated by Mr. James Leone.**

9. Furnish a flow diagram of the coke plant operations.

ANSWER **See engineering drawing number 20489, labeled Exhibit #9 attached hereto.**

10. Furnish a description and flow diagram of your baking soda production process.

ANSWER **See engineering drawing number 29229, labeled Exhibit #10 attached hereto.**

11. Did BASF or any predecessor produce ferric ferrocyanide as an end product, waste, or generate it as a byproduct?

ANSWER **To our knowledge BASF and any predecessor companies did not produce ferric cyanide as an end product, waste, or generate it as a by-product.**

12. Furnish a description of all byproducts and/or wastes generated as a result of the baking soda process, and any cyanide compounds and/or sulfur compounds produced in the coke operations.

ANSWER **BASF produced baking soda (sodium bicarbonate) by a process of rehydrating and recarbonating soda ash (sodium carbonate) which was a product produced in the same complex. There were essentially no wastes produced in this process.**

Wastes generated by the production of the precursor soda ash included:

1) Carbon dioxide
2) Distiller Blow Down which was a mixture of lime, calcium carbonate, sodium carbonate, calcium chloride, sodium chloride, calcium sulfate, and sodium sulfate. This material was sent to Fighting Island in the Detroit River.

Calcium chloride was for a time produced as a byproduct of this operation.

No analysis of cyanide or sulfur compounds from coke plant operations has been found in our records. However, it is known that sulfur compounds were produced because they were recovered and sent to the soda ash complex as corrosion inhibitors fed to the

process to protect the cast iron equipment in the plant. The exact composition of this stream is not known, but it is known to have been a mixture of various sulfides.

13. For all white powder substances known to have been disposed of or likely to have been disposed of by J.B. Ford Company during the period 1935 to 1937, identify the nature of the material, including the chemical content, characteristics and the process in which the substance was used or the process by which it was generated and identify all disposal locations.

ANSWER **BASF has no knowledge or information about any white powder substances allegedly disposed of by J. B. Ford Company during the period 1935 - 1937. A diligent search for J. B. Ford Company records has been unsuccessful. Any records of J. B. Ford Company for that time period were probably destroyed according to the company's record retention policies at that time or lost.**

14. Furnish all property records, such as title documents, insurance policies, assets, plat maps, property descriptions, and building descriptions pertaining to BASF or any predecessor corporation's purchase of the property located at the southeast corner of Perry and Biddle Streets in Wyandotte, Michigan, formerly the site of the Detroit City Gas Company.

ANSWER **See Exhibits #14A, #14B, and #14C attached hereto.**

15. Identify all assets included in any transaction or arrangement related to BASF or any predecessor corporation's purchase of the property referred to in number 14 above.

ANSWER **No transaction records currently exist except for those records provided in response to number 14 above. See answer to number 14 above.**

16. What was the condition of Station I at the time of purchase, and did the purchase include any of the following:

a) ferric ferrocyanide
b) ammonia tanks
c) waste products
d) gas cleaning processes
e) iron purifiers
f) surplus chemicals (identify the various chemicals)

ANSWER **a) According to Mr. James Leone approximately one ton of bluish-green material was in the purifier vessel after Michigan Alkali purchased Station I.**

b) **Not to our knowledge.**

c) **Other than the material mentioned in a) above, it is believed that there were no other waste products present.**

d) **Idle purification vessel.**

e) **See answer to d) above.**

f) **Not to our knowledge.**

17. Did BASF assume the liabilities, if any, of Michigan Alkaline, Detroit Soda Products Company, and Wyandotte Chemical? If your answer is anything but an unqualified "yes," explain in detail BASF's relationship with the entity and provide a detailed explanation for your denial of assumption of liabilities.

ANSWER **See answer to number 5 above. With respect to Detroit Soda Products Company, there is no indication based upon existing BASF records and personal interviews with former employees, that BASF and Detroit Soda Products Company are related entities.**

18. Identify by name, social security number, telephone number and last known address, all persons involved in waste disposal who were employed by BASF or any of its predecessors, between 1920 and 1945.

ANSWER **The yard and transportation employees were primarily responsible for this activity. Outside contractors were also used on occasion. Human Resources records were reviewed, but we were unsuccessful in identifying any employees in those departments.**

19. Did the Coke Plant ever dispose of any materials, wastes, substances, which contained ferric ferrocyanide, gas wash or gas wash wastes, cyanide compounds, and/or sulfur compounds? If so, identify the nature of the material, including the chemical content, characteristics, physical state (e.g., solid, liquid), and the process for which the substance was used or the process which generated the substance and identify all disposal locations.

ANSWER **Ferric ferrocyanide - Detroit City Gas Company supplied the City of Wyandotte with gas for home cooking from Station 1. To be used for this purpose, it had to be cleaned in a vessel called a purifier which used iron shavings to further purify the gas and the reaction between the metal shavings and the contaminants in the gas apparently formed ferric ferrocyanide (Prussian Blue).**

Gas wash or gas wash wastes - Gas wash waste was generated but there are no records as to their final disposition.

Cyanide and/or sulfur compounds - Waste tars (contained these compounds) from the tar tanks was disposed of primarily on-site and off-site in Monroe, MI.

20. Did BASF or any of its predecessors sell gas to Detroit City Gas Company? If you answer to this question is anything but an unqualified "no," furnish the following:

a) supply dates of arrangements;
b) furnish a description of the specific source of the gas sold;
c) identify the chemical nature of the gas;
d) identify the amount of gas sold to the Gas Company.

ANSWER a) Michigan Alkali furnished coke oven gas to the Detroit City Gas Company between 1916 and 1936

(Refer to Exhibit #20 attached hereto).

b) Coke ovens at the Wyandotte Site.
c) Although no specific records exist, coke oven gas is known to contain carbon dioxide, oxygen, carbon monoxide, methane, hydrogen, nitrogen, tar, ammonia, light oil.

d) Unknown.

21. Did BASF continue operations at Station I (formerly the Gas Company) after Respondent's purchase of the Facility? If so, furnish a detailed diagram of all of the Respondent's operations.

ANSWER Yes. The gas from the coke ovens was piped to equipment called coolers which removed the majority of the tars from the gas. The gas was then piped to equipment called precips which removed the residual tars that were not removed by the coolers. The tars from the coolers and the precips was drained into tar tanks. The tar was sold to Barrett Refinery. After the precips, the gas went to a water scrubber to remove ammonia. The gas was then conveyed to two oil mist scrubbers in the Benzol Plant. The gas was then piped to a gas holder at Station 1.

(Refer to diagram sketched by James Leone, labeled Exhibit #21).

After the purchase of Station I by Michigan Alkali, the gas was sent for a short time to the FM operation and after the construction of a pipeline was sent to the

South Works where the gas was used to heat the pots in the Caustic Plant.

22. Identify all persons, including yourself and any predecessor corporations, who may have arranged for disposal or treatment or arranged for transportation for disposal or treatment of ferric ferrocyanide, gas wash and/or gas wash wastes, cyanide compounds, at the Site. In addition, identify the following:

a - q

ANSWER **No information available.**

EXHIBITS

Exhibit 7	Personnel record of Curtis Oscar Messer
Exhibit 9	Engineering drawing number 20489; diagram of Coke Plant operations.
Exhibit 10	Engineering drawing number 29229; diagram of baking soda production process.
Exhibit 14A	Deed
Exhibit 14B	Engineering drawing number 12181; Plot Plan of North Works
Exhibit 14C	Property Survey
Exhibit 20	Articles - Michigan Alkali Gas Supply
Exhibit 21	Sketch - Station I operations

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